

UPDATE TO THE Intellectual Property Hub Master Plan



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EXECUTIVE SUMMARY

- 1 In April 2013, the Singapore Government announced a 10-year master plan to guide the country towards becoming a Global IP Hub in Asia. The IP Hub Master Plan aims to capture opportunities presented by increasing IP activities internationally to drive business and economic growth for Singapore.
- 2 The blueprint identified three strategic outcomes for Singapore, namely, (i) A Hub for IP Transactions and Management; (ii) A Hub for Quality IP Filings; and (iii) A Hub for IP Dispute Resolution. It also identified two enablers to support the three outcomes. These are (i) Skilled manpower resources networked to the region and beyond; and (ii) A conducive and progressive environment for IP activities.
- 3 Over the past four years, we have made significant progress in building a **strong and reliable IP regime that is well plugged into international networks**. Our companies have good access to foreign markets through the many IP partnerships that Singapore has forged with our key export destinations. We have also made headway in providing a support system for Singapore enterprises to level up in terms of IP awareness and management. Innovative enterprises now also have an avenue to monetise their IP through the IP Financing Scheme.
- 4 This has been achieved against a backdrop of sluggish global economic growth and world trade. We are also witnessing technological disruptions that have revolutionised business models and consumption patterns. Governments around the world are increasingly turning to innovation as the next driver of economic progress, and IP has emerged as an increasingly important strategic asset for businesses.
- 5 Not to be left behind, Asia is now at the growth frontier for innovation and IP activities. Asian economies have been increasing their investments into Research and Development (R&D). Asian corporations are seeing strong valuation of their intangible assets, including brands and technologies. Many innovative companies have relied on the IP system successfully to protect and capture value from their investments. Notable examples include Samsung and Huawei, both of which have succeeded in commercialising their IP in various ways. Asia has now overtaken other regions in terms of IP filing activities.
- 6 Singapore's own innovation journey started in the early 1990s with the development of its R&D sector. We have in place several initiatives to build research competencies and grow start-ups. Our heavy investment into the innovation ecosystem is reflected in our consistently high standing in international studies such as the Global Innovation Index (GII) and the World Economic Forum (WEF) Global Competitiveness Report.
- 7 On the other hand, the same set of studies also highlights the need for Singapore to achieve better economic outcomes that commensurate with the level of our investment in innovation. The Committee on the Future Economy (CFE), which released its report in February 2017, recommended to

strengthen enterprise capabilities to innovate and scale up through building greater capacity for IP commercialisation.

- 8 Ideas need to be protected before they can be commercialised or give our companies a sustainable competitive edge. In addition, **our innovators and entrepreneurs have to be more adept at managing and transacting IP.** This will ensure that our investments in R&D generate value for the Singapore economy and society. The next phase of the IP Hub Master Plan thus presents an opportunity for us to enable innovative enterprises to actively commercialise and monetise their IP.

Ideas to Assets: Recommendations to strengthen our innovation ecosystem through IP strategies

- 9 Innovative companies should protect their IP effectively to secure and maintain their competitive edge in the global market. IP should not be viewed as a mere legal or technical issue. Instead, corporate leaders need to incorporate IP considerations into their business strategies.
- 10 The Intellectual Property Office of Singapore (IPOS) undertook a year-long consultation in 2016 to find out more about the role of IP in the innovation cycle. This consultation involved key stakeholders from Singapore and overseas for the purpose of understanding gaps and opportunities in our innovation ecosystem. In parallel, IPOS also commissioned a study on the IP Transaction and Management (IPTM) ecosystem in Singapore, which referred to international best practices. The findings, which also considered the imperatives of the CFE report and RIE2020 Plan, cumulate into the set of recommendations in this Update to the IP Hub Master Plan.
- 11 This Update organises the key challenges and opportunities for Singapore in strengthening our innovation ecosystem along the lines of how businesses would make use of IP throughout the innovation cycle. At each stage of the innovation cycle, we examine how **growing IP expertise, improving the regime, and creating an effective marketplace will enable Singapore to achieve better innovation outcomes through greater success in IP commercialisation.**

Growing IP expertise

- 12 IP expertise is increasingly important in today's innovation economy. It requires knowledge in business, technology and legal fields.
- 13 Our consultations with the innovation community found that more can be done to achieve better commercialisation outcomes. To make sharper and market-driven R&D decisions, we should **grow expertise needed to make sense of technology and business data.** IPOS has started to build expertise in technology foresighting and patent analytics. As patent filing tends to lead market growth, analysis of patent data will enable Singapore to find opportunities and collaborators.

- 14 For companies that have embarked on their R&D journey and require support to protect their IP effectively, we will also **grow a bigger pool of IP expertise able to assist inventors and innovative companies on IP protection** (such as patent drafting, patent litigation, and IP strategy). To train more IP experts, IPOS has started to expand its collaboration with institutes of higher learning while tapping on workforce related policies such as SkillsFuture and Professional Conversion Programmes.
- 15 For innovative companies seeking to expand overseas, a good knowledge of IP protection overseas is critical. More could be done to help businesses understand how to protect their innovations in overseas IP regimes, such as through “on-the-ground” support in the form of IP attaches for major markets. IPOS set up its first overseas IP office in China in 2015. Singapore should continue **to build and deploy expertise to assist companies in understanding the foreign IP regimes** in our key export markets.
- 16 IP commercialisation expertise remains relatively rare all over the world. An emerging skillset, it requires a unique combination of technical knowledge and commercial acumen. IPOS is committed to **developing and centralising whole-of-government IP management (“IPM”) expertise**. These experts can be deployed to public agencies to help manage and commercialise their IP, as well as to formulate IP policies and practices that drive industry growth and innovation outcomes. Companies supported by our economic agencies can also benefit from this pool of IPM experts.
- 17 IP valuation is key to the success of any IP financing scheme. IPOS will work towards **establishing a set of practices, standards and certification on IP valuation**. We will also explore international adoption of these IP valuation practices and certification programmes through overseas partnerships. Valuation expertise will enable investors and financiers to make better financing decisions for IP-rich companies.
- 18 Our study found that IP jobs in Singapore typically command a premium of 30 per cent. With the above initiatives, Singaporeans can look forward to better jobs, as well as reskilling opportunities and training in the innovation and IP sector.

Improving the IP and innovation regime

- 19 Singapore’s IP regime has consistently been rated as one of the best globally. With the emphasis on innovation in the future economy, the government should do more to shape an environment that encourages innovation, and rewards innovators through commercialisation and monetisation opportunities.
- 20 Innovative companies, which are IP-rich but physical asset-light, need support to grow their businesses. We should **align whole-of-government efforts to support innovative companies**. The IPTM study recommended more coherence in the administration of government grants available to businesses. The Ministry of Law (MinLaw) and IPOS are working with SPRING and other economic agencies to include IP considerations clearly within existing grant

structures. This will enable us to streamline policy measures designed to incentivise and support IP creation in the innovation cycle.

- 21 However, the value of IP protection is anchored in the ability of companies to effectively and efficiently enforce their IP rights. The study found that the enforcement of IP may at times be too costly and lengthy, especially for small businesses. IPOS will work with MinLaw on increasing access to the IP dispute resolution system. This can be done through streamlining the IP dispute resolution system in Singapore, and **ensuring IP dispute resolution is cost effective**.
- 22 For innovative companies seeking growth capital investments to scale up and expand overseas, there is now the option of using the IP Financing Scheme (IPFS) to obtain bank loans using patents, trade marks and copyright as collaterals. While Singapore is amongst the first in the world to do so, the traditional banking model may not be entirely suited to IP-based lending. To further help our innovative companies to scale, we will **consider alternative methods of financing for intangible assets**, such as through private equity and insurance.
- 23 The study found that the development of better intangible asset reporting will encourage greater monetisation of IP. Accounting and valuation of intangible assets still lag behind similar treatment for brick and mortar businesses. There is opportunity for Singapore to be a first-mover in tapping on a global economy increasingly driven by the creation of intangible assets. With our global status as a financial and legal hub, the study found value for Singapore **to consider the development of guidelines for intangible asset reporting**. It also recommended for us to explore initiatives that will encourage more companies and service providers to take an active interest in identifying, reporting and realising IP value.
- 24 Singapore enterprises should be given **greater access to publicly funded technologies**. The CFE has recommended for Singapore to push out IP arising from publicly-funded R&D to the market. MinLaw and IPOS, together with other agencies, have started work on drafting a National IP Protocol and updating the Master Research Collaboration Agreement (MCRA) to simplify, standardise and shorten IP negotiations by public research performers with the industry. A key objective is to enable greater commercialisation of government IP.
- 25 In addition, while there are several schemes to develop R&D capabilities and technologies, the consultation suggested that more can be done to **anchor post-R&D economic activities in Singapore**. This includes activities such as the commercialisation of IP and ensuing production, which will create high value jobs and new product/service offerings for Singaporeans. MinLaw and IPOS are working with the economic agencies to introduce the IP Development Incentive (IDI) scheme which will promote the exploitation of IP arising from R&D activities undertaken in Singapore.

Creating an effective marketplace

- 26 To further support IP commercialisation, more can be done to create a network of innovators. IPOS will therefore **bring together a community of IPM practitioners** both from the government agencies, as well as private sector, to enable better IP commercialisation outcomes for Singapore.
- 27 To help our innovators and companies better commercialise IP, SMEs need to be equipped with the requisite IP and business strategy tools without the additional burden of high cost. IPOS will be launching a self-help business portal, comprising business guides and diagnostic toolkits for SMEs. IPOS is also partnering SPRING to **enable our innovative companies to obtain subsidised customised one-on-one assistance for IP audit and IP strategy**. These efforts will give innovative companies greater access to IP advice which is central to any successful business strategies.
- 28 Innovation must make a difference in the real world. An effective marketplace is key for companies to monetise their IP. At the outset, R&D ought to be market-driven to enable commercialisation of products and/or services arising from new IP. The study called for better tracking of R&D performance. There is a need to **develop a platform for monitoring indicators pertaining to the commercialisation of publicly-funded R&D**. Beyond patent filings and licensing volume, the data should include information such as the number of spin-off companies created, new products launched and revenue from licensed products.
- 29 To further nurture the IP market place in Singapore, the IPTM study recommended for Singapore to **explore new platforms for increasing transparency and access to IP-related market information**. IPOS will be working with Intellectual Property Intermediary (IPI), an agency under SPRING, to analyse and bundle complementary IP from Singapore and overseas to further help companies access IP.

Conclusion

- 30 The IP Hub Master Plan of 2013 has enabled Singapore to achieve considerable progress in terms of building a strong IP regime and deep networks on the international front. With progress achieved and the global momentum towards innovation, it is timely for Singapore to devote more resources towards the IP transactions and management aspect of the IP Hub Master Plan.
- 31 MinLaw and IPOS have started working on several recommendations based on the year-long consultation. These initiatives will enable Singapore to capture greater value from her R&D investments. Through more IP transactions and better IP management, we estimate a value add of **at least S\$1.5 billion to the Singapore economy in the next five years**. We seek to achieve the following results:

Expertise	Regime	Marketplace
<ul style="list-style-type: none"> • Increase the number of experts in IP, especially IP commercialisation. Overall, to increase IP jobs from 500 to 1,000 over the next 5 years. 	<ul style="list-style-type: none"> • Achieve efficiency ratio rank of 65 in WIPO Global Innovation Index in 5 years. 	<ul style="list-style-type: none"> • Help 1,500 companies understand the value of their IP by 2019 • Provide customised 1-on-1 IP audit and IP strategy assistance to 150 companies by 2019

We seek to continue advancing Singapore’s IP regime, grow and deepen IP expertise, and develop a better, more effective, IP marketplace. In all, the update to the IP Hub Master Plan will help Singapore to achieve better economic outcomes in the future economy.

Summary of key gaps and recommendations

	Expertise	Regime	Marketplace
IP Creation	Gap 1: Poor application of data analytics (e.g., patent information) to ensure innovation success.	Gap 2: Lack of coordination among agencies to support innovative companies.	Gap 3: Absence of strong collaboration within the innovation community.
	Initiative 1: Develop expertise in technology forecasting and patent analytics.	Initiative 2: Align whole-of-government efforts to support innovative companies.	Initiative 3: Grow and deepen innovation networks.
IP Protection	Gap 4: Lack of access to IP protection advice. Gap 5: Poor knowledge of IP issues in export markets.	Gap 6: High cost of IP enforcement.	Gap 7: Lack of tools for SMEs to understand and protect their IP.
	Initiative 4: Strengthen legal and drafting expertise by introducing multiple pathways to patent agent qualifications. Initiative 5: Build and deploy expertise to provide international advice on IP protection.	Initiative 6: Enable cost effective options for businesses through IP dispute resolution.	Initiative 7: Equip SMEs with IP and business strategy tools.
IP Commercialisation	Gap 8: Lack of IP commercialisation expertise.	Gap 9: Outdated funding models for innovative companies. Gap 10: Weak application of intangible assets.	Gap 13: Lack of collaboration and networking between research and industry. Gap 14: Absence of an active marketplace to

		<p>Gap 11: Need for stronger returns from R&D investments.</p> <p>Gap 12: Need to anchor post-R&D economic activities in Singapore.</p>	enable IP transactions.
	<p>Initiative 8: Develop expertise in IP commercialisation.</p>	<p>Initiative 9: Pilot new financing models for IP assets.</p> <p>Initiative 10: Promote intangible asset reporting in Singapore.</p> <p>Initiative 11: Develop a national IP protocol and whole-of-government Master Research Collaboration Agreement (MCRA).</p> <p>Initiative 12: Refine tax incentives to anchor economic activities in Singapore.</p>	<p>Initiative 13: Develop platforms for better tracking of IP and innovation performance.</p> <p>Initiative 14: Improve access to IP market information.</p>

SECTION 1

STOCKTAKE OF THE IP HUB MASTER PLAN 2013

1.1 Background

1.1.1 Published in April 2013, the Intellectual Property (IP) Hub Master Plan sets out the IP Steering Committee's recommendations for Singapore to develop as a Global IP Hub in Asia¹ over the next ten years. The IP Hub Master Plan was motivated and underpinned by three key considerations:

- (a) First, the recognition that IP plays an increasingly important role in driving the growth of businesses and economies in a knowledge-based and innovation-driven economy;
- (b) Second, the increasing concentration of IP activities in Asia; and
- (c) Third, the emerging opportunities for Singapore to capture a slice of international workflows, through leveraging our existing strengths such as our global connectedness, best-in-class legal and financial infrastructure and highly-skilled workforce.

1.1.2 The intention of the IP Hub Master Plan was to develop strategies to generate high-value employment opportunities and position Singapore well for the next phase of economic development.

1.1.3 The IP Hub Master Plan sets out three Strategic Outcomes and two supporting Enablers. The rest of this section summarises the progress made on the Strategic Outcomes and Enablers.

1.2 Strategic Outcome 1: A Hub for IP Transactions and Management

1.2.1 The IP Hub Master Plan recognised the tremendous potential for the value of IP assets to be further unlocked, including better monetisation. IP rights are increasingly recognised as more than mere legal rights. A portfolio of IP rights can be an extremely valuable business asset, one which should be proactively managed to derive maximum benefit for the organisation.

1.2.2 This Strategic Outcome thus recognises the potential for Singapore to be a vibrant IP marketplace where people can transact and manage IP. Singapore already boasts a vibrant capital market and a reputation as a trusted, neutral and secure business location, home to global and regional headquarters of several multinational corporations (MNCs). Extending this further to the area of IP transactions and management will create more high-value job opportunities and lead to better commercialisation of IP.

¹ The IP Steering Committee was set up by the Government in May 2012, and tasked to recommend strategies to develop Singapore as an IP Hub. The Steering Committee was chaired by Mr Teo Ming Kian, then Chairman of MediaCorp Pte Ltd. It was supported by two Sub-Committees. The first Sub-Committee was co-chaired by Mr Magnus Bocker (then Chief Executive Officer, Singapore Exchange) and Mr Viktor Cheng (then Deputy Chief Executive (DCE), Intellectual Property of Office (IPOS)), and focused on IP transactions and commercialisation. The second Sub-Committee was co-chaired by Dr Stanley Lai SC (Head of IP Practice, Allen & Gledhill) and Ms Danielle Yeow (then DCE, IPOS), and focused on IP capabilities and infrastructure.

Recommendation 1: Attract top, international IP intermediaries to facilitate IP transactions through incentive schemes.

Recommendation 2: Collaborate with industries to establish a one-stop licensing platform that allows users to easily obtain licenses for relevant forms of copyrighted works in Singapore, and grow it over time to potentially support the licensing markets in the region.

Recommendation 3: Support and co-fund a diverse array of projects across the entire IP marketplace ecosystem.

- 1.2.3 The first three recommendations under Strategic Outcome 1 pertain to putting in place the necessary marketplace elements such as middlemen, brokers, platforms and other infrastructure to facilitate marketplace transactions.
- 1.2.4 An Economic Development Board (EDB)-Ministry of Law (MinLaw) Joint Programme Office had been set up to develop the IP and legal sectors.
- 1.2.5 The recommendation to establish a digital copyright licensing platform is currently being studied in greater detail as part of MinLaw and the Intellectual Property Office of Singapore (IPOS)'s review of Singapore's copyright regime.²
- 1.2.6 Several insights were gleaned in pursuing these recommendations.
- (a) Globally, the landscape for IP intermediaries (e.g., IP brokers) and service providers is a fragmented one, characterised by several small players serving Small- and Medium-sized Enterprises (SMEs).
 - (b) There are no compelling examples of successful, sustainable, and internationally-oriented IP exchanges or marketplaces anywhere in the world. Existing platforms are usually localised (i.e., focusing on IP from a particular region/country) and/or have few significant transactions.³ This may be because IP rights are less amenable to commoditisation (e.g., patents are not homogenous and it is difficult to arrive at a universally agreed market price for one), and businesses have a preference for confidential transactions (as IP transactions are revealing of a company's business strategies).
 - (c) An active transaction market is fuelled partly by the prospect of litigation. For example, a company would be more inclined to negotiate a licensing deal if the threat of being sued for patent infringement is very real. It is well-established that the United States (US), where IP transactions are more prevalent, is a significantly more litigious environment compared to Asia.
 - (d) Within Asia, the level of IP understanding and sophistication is generally higher in North Asia such as Japan, Korea and Taiwan, than in the rest of Asia. IP service providers are more inclined to be located in those places,

² Ministry of Law, 2016. *Public Consultation on Proposed Changes to Copyright Regime in Singapore*. <https://www.mlaw.gov.sg/news/public-consultations/public-consultation-on-proposed-changes-to-copyright-regime-in-s> (accessed Feb 2017).

³ Examples of IP exchanges include: Asia IP Exchange (based in Hong Kong), Global IP Exchange (based in Singapore) and IP Exchange (based in the United Kingdom (UK)).

to be closer to clients who are more active in the IP marketplace, and where the market is larger.

- 1.2.7 While we continue to engage IP intermediaries, a longer term effort would be to develop domestic enterprises, and increase the ability of innovative companies to harness IP rights for greater commercial benefit. This would create a larger market to make it more attractive for IP marketplace platforms and service providers.

Recommendation 4: Introduce an IP financing scheme, where the Government partially underwrites the value of IP used as collateral.

- 1.2.8 IPOS launched the IP Financing Scheme (IPFS) in April 2014 to help tech-rich Singapore companies raise finances by using IP as loan collateral, and familiarise Singapore's financial industry with the idea that intangible assets can be collateralised.

- 1.2.9 Since its inception, a number of home-grown companies have enjoyed the benefits of this scheme, including Masai International Pte Ltd, NSP Tech Pte Ltd and GlobalRoam Pte Ltd. These companies represent a range of industries from footwear, medical devices to telecommunications.

Recommendation 5: Set up a Centre of Excellence for IP Valuation to promote excellence in the research and practice of valuation to support IP transactions.

- 1.2.10 In August 2014, Singapore launched IP ValueLab (IPVL), a fully-owned subsidiary of IPOS. As the enterprise engagement arm of IPOS, IPVL aims to help businesses unlock the value of their IP assets to gain and sustain a competitive edge.

- 1.2.11 IPVL has initiated a range of activities to grow IP valuation capabilities in Singapore, such as partnering with Singapore Accountancy Commission to develop and promote IP valuation guidelines, methodologies and best practices, developing curriculum for the training of IP valuers and conducting IP financing and valuation seminars. IPVL has also deepened IPOS' enterprise engagement activities by actively engaging IP-rich businesses that require assistance to better integrate IP into their business strategies.

Recommendation 6: Support IP securitisation activities in Singapore where appropriate.

Recommendation 7: Attract IP fund management activities to Singapore, to enhance the slate of IP financing avenues and create spin-off demand on other sectors.

Recommendation 8: Work with industry to encourage positive practices that would enhance the transparency of IP transactions.

- 1.2.12 These three recommendations focus on more complex financing arrangements and transactions based on IP.

- 1.2.13 Given that IP transaction, financing and management are in their early stages of maturity in Singapore, more headway has to be made with existing initiatives before businesses are ready to contemplate these activities on a larger scale. As such, while the benefits of these recommendations are still recognised and

affirmed, they remain exploratory at this stage and will be focused on after the IP and business communities have reached a level of familiarity with IP management and the integration of IP considerations into business strategy.

Conclusion for Strategic Outcome 1: A Hub for IP Transactions and Management

1.2.14 In implementing the various recommendations under the first Strategic Outcome, it was evident that this is an ambitious objective, and one which requires significant groundwork before it can be realised. IP transactions and management is also a nascent field in many other established jurisdictions, with the possible exception of the US where sophisticated IP activities are more commonplace.

1.2.15 Thus far, we have succeeded to put in place the necessary support system for domestic enterprises to level up in IP awareness and management (IPVL) and the starting blocks for IP financing (government-supported IPFS). The immediate focus is to **build up capabilities of domestic enterprises and financial institutions to commercialise and transact IP assets**. This will then set the stage for more complex marketplace activities at a later stage.

1.3 Strategic Outcome 2: A Hub for Quality IP Filings

1.3.1 Businesses and innovators alike have increasingly been making use of the IP system to protect intellectual assets. There has been an increasing number of IP filings worldwide, and especially in Asia. In fact, Asia as a region now accounts for the largest share of patent, trademark and design filing activity globally.

1.3.2 This second Strategic Outcome recognises the opportunity for Singapore to benefit from the increase in IP activities in the region. As a highly globalised economy that is host to Research and Development (R&D) facilities of a large number of MNCs, there are opportunities to attract IP filings to Singapore.

Recommendation 9: Build a Search and Examination (S&E) team capable of producing quality S&E services expeditiously within publicised target timeframes, which should be equal to or better than that offered by the best in the world, and cost-efficiently.

1.3.3 IPOS has built a team of more than 100 patent examiners with expertise spanning a wide range of technologies – engineering, Information and Communications Technology (ICT), semiconductor, chemistry etc. More than 90 per cent of the patent examiners are scientists with PhD qualifications. The patent examiners have received training from the European Patent Office (EPO), Japan Patent Office (JPO) and US Patent and Trademark Office (USPTO). The in-house pool of highly qualified and well trained patent examiners ensures that Singapore granted patents are of a high quality.

1.3.4 IPOS' S&E team is ISO 9001:2008 accredited for its S&E services. The quality of the S&E unit was further affirmed when IPOS was appointed as an International Searching and Preliminary Examining Authority (ISA/IPEA) under the Patent Cooperation Treaty (PCT) in September 2014. It was the first IP Office appointed as ISA/IPEA in ASEAN. IPOS turned operational as the 19th ISA/IPEA a year later. IPOS is recognised by the IP offices of USA, Japan,

Mexico, and five ASEAN countries (Brunei, Indonesia, Laos, Thailand and Vietnam) to handle their PCT S&E work.

- 1.3.5 Besides S&E, IPOS has also developed capabilities in patent analytics, which involves studying and translating large sets of patent data into a strategic analysis of current market situation. This capability enables better informed R&D decisions. IPOS' S&E team is currently supporting several Singapore government agencies in technology foresighting to identify growth areas and enable better returns from our R&D investments.

Recommendation 10: Build comprehensive international networks and collaborations with other IP offices to develop Singapore as a gateway to other markets.

- 1.3.6 A Patent Prosecution Highway (PPH) is a work-sharing arrangement that allows a patent applicant to use an earlier S&E report to speed up patent prosecution in another jurisdiction. This enables applicants to enjoy time and cost savings as patent offices are able to reduce their turnaround time by referring to the work of another patent office.
- 1.3.7 Singapore has made great strides in plugging into a comprehensive network of patent offices, including all of the five top IP markets namely US, Europe, China, Japan and Korea (IP5). Singapore is one of the two patent offices in the world that has PPH arrangements with all IP5 countries. IPOS' network of work-sharing arrangements comprises:
- (a) the Global PPH (GPPH) network, which includes 21 other participating offices,
 - (b) bilateral PPHs with EPO, Instituto Mexicano de la Propiedad Industrial (IMPI) of Mexico and the State Intellectual Property Office (SIPO) of China, and
 - (c) the ASEAN Patent Examination Co-operation (ASPEC) initiative, a regional work-sharing arrangement involving 9 ASEAN member states (Myanmar is an observer).
- 1.3.8 In this way, an S&E report from IPOS can be used to speed up patent prosecution in more than 30 global markets. To date, there have been over 160 cases where patent applicants have benefited from these arrangements.
- 1.3.9 Going a step further, IPOS has also established a patent re-registration system with Cambodia. Under this arrangement, a patent granted by IPOS can be re-registered without examination in Cambodia and patent applicants can thus have direct access to a 20 million strong market with a Singapore-granted patent.

Recommendation 11: Grow a larger pool of Singapore-qualified patent agents with the necessary expertise to cater to the needs of international companies and attract more patent work to Singapore.

- 1.3.10 Singapore is continually enhancing the patent agent profession to ensure that patent applicants have access to the necessary expertise to obtain high quality patents. The number of practicing patent agents in Singapore has grown steadily, from 85 in 2010 to 130 in 2016.

- 1.3.11 In August 2016, IPOS announced plans to enhance the patent agent profession by offering an alternative pathway to qualify as a registered patent agent. Beginning from July 2017, prospective patent agents will be able to enrol in the Master of IP and Innovation Management programme offered by the Singapore University of Social Sciences (SUSS), and embark on the patent agency specialisation track. This new programme provides an alternative to the existing Graduate Certificate in IP programme offered by NUS.
- 1.3.12 By offering two pathways, the patent agent profession will benefit from a richer mix of backgrounds and skillsets. This will also prepare Singapore to meet the increased demand for patent agent services, as patenting activity in the region continues to grow.

Conclusion for Strategic Outcome 2: A Hub for Quality IP Filings

- 1.3.13 Singapore has made notable progress on this Strategic Outcome, and **has put in place much of the necessary infrastructure to act as a gateway for patent applicants to the region and beyond.**
- 1.3.14 While these recommendations improve the value proposition of seeking patent protection in Singapore, our priorities have evolved since the IP Hub Master Plan was first unveiled. Instead of focusing on IP filings in Singapore, the emphasis is now on capturing work in Singapore from quality IP filings anywhere in the world. Put another way, the focus is on undertaking valuable work along the patent prosecution process, even if the filing is eventually made elsewhere.
- 1.3.15 IPOS' operations as a PCT ISA/IPEA is a useful illustration of this. Patent applicants may elect to have IPOS perform the international search and preliminary examination. The ISA/IPEA report from IPOS is used by the applicant to enter its markets of interest. The applicant may not eventually seek patent protection in Singapore. In this way, valuable IP work is still created in Singapore. This allows Singapore to leverage our highly-skilled patent examiners and service providers to capture value, without being hampered by our small market size (which diminishes incentives to seek patent protection here).

1.4 Strategic Outcome 3: A Hub for IP Dispute Resolution

- 1.4.1 Another activity which generates high-value work in Singapore and profiles Singaporean institutions is dispute resolution. While IP laws and rights are territorial in nature, a judgment issued by a well-respected court in one country can be persuasive in similar proceedings elsewhere. Given Singapore's international reputation for quality court judgements and an efficient court system, there is potential for Singapore to attract international IP disputes to be litigated here.
- 1.4.2 In addition to court litigation, Alternative Dispute Resolution (ADR) can also be used by parties. There are several modes of ADR, including mediation and arbitration, and their main benefits to disputants include the ability to better control the pace and process of the proceedings and maintain confidentiality. Likewise, Singapore is in a good position to advance its position as a centre for IP ADR. For example, the World Intellectual Property Organization (WIPO) set

up its first and only Arbitration and Mediation Centre (AMC) outside Geneva in Singapore in 2010.

Recommendation 12: Enhance the profile and strengthen the capabilities of Singapore's IP Court to attract more IP litigation to Singapore.

- 1.4.3 Released in September 2013, the IP Court Guide sets out special case management procedures for IP cases. For example, IP cases are identified and placed on a specialised docket, and the assigned IP judge plays a more active role in the case management process (e.g., interlocutory appeals are heard by the IP judge). In this way, the judge will be able to focus attention on the key features of the dispute, which facilitates timely resolution.
- 1.4.4 The High Court also has a list of seven IP judges⁴ who have greater experience and expertise in IP matters to hear IP cases. This facilitates further deepening of expertise and improves the quality of decisions.

Recommendation 13: Establish a panel of top international arbitrators in Singapore to enhance the international profile of Singapore's IP ADR capabilities and attract more IP-related ADR cases to Singapore.

- 1.4.5 The Singapore International Arbitration Centre (SIAC) has established a specialist panel of 19 IP arbitrators, which includes internationally-renowned IP experts.⁵

Conclusion for Strategic Outcome 3: A Hub for IP Dispute Resolution

- 1.4.6 Singapore has made good progress with implementing the Steering Committee's recommendations. Even so, more can be, and is being, done to **position Singapore as a choice venue for resolving international IP disputes**, including coordinating with the various ADR institutions in Singapore and putting in place the necessary legal instruments to facilitate the overseas enforcement of decisions rendered in Singapore. This is a crucial consideration for MNCs deciding on their IP dispute resolution strategies.

1.5 Enabler 1: Skilled manpower resources networked to the region and beyond

- 1.5.1 To support the three Strategic Outcomes, a consistent pipeline of skilled IP manpower is needed. Singapore begins from an advantageous position, with a sizeable proportion of the population having a strong background in science and technology, its strong education standard, and a keen international outlook.
- 1.5.2 The Steering Committee recognised the foundation laid by the IP Competency Framework (IPCF), developed by IPOS in consultation with industry stakeholders. The IPCF is an overview map of the IP industry, and describes career pathways along five "verticals" spanning the skillsets required for a thriving IP ecosystem. It thus provides a systematic point of reference for individuals wishing to embark on or switch to a career in IP.

⁴ As of 5 Jan 2017.

⁵ As of 5 Jan 2017.

Recommendation 14: Develop strategic areas of expertise under the IPCF, with special focus on, but not limited to Patent Agents, IP Management Directors, IP Strategists and IP Valuation Analysts, and to serve as a training hub for IP professionals in the region to better create a strong network of IP skills and expertise across jurisdictions.

- 1.5.3 IPOS and Workforce Singapore (WSG) have jointly introduced the Professional Conversion Programme for Trainee Patent Agents (PCP-TPA) in April 2015. This programme provides funding to Singapore-based firms that nurture newly hired trainees who aspire to become Registered Patent Attorneys in Singapore.
- 1.5.4 In addition to efforts to enhance the patent agent profession, IPOS has put in place accreditation schemes for two IPCF professions: IP Management Consultants and IP Technology Consultants.
- 1.5.5 The IP Management Consultant accreditation scheme was developed in conjunction with the Singapore Business Advisors and Consultants Council. Currently, there are 14 certified IP Management Consultants.⁶
- 1.5.6 The IP Technology Consultant accreditation scheme was developed in conjunction with the Institute of Engineers Singapore. Currently, there are 22 certified IP Technology Consultants.⁷
- 1.5.7 These accreditation schemes offer greater assurance of quality to users of IP services, and confers professional recognition of expertise on service providers. They are also useful milestones for those who wish to progress in their IP careers.

Recommendation 15: Seed interest in various IP career paths and develop understanding of IP from an early stage, so as to position the IP profession as a rewarding one.

- 1.5.8 To instil a good understanding of IP at an early stage, IPOS has worked with Nanyang Technological University (NTU)'s Engineering Faculty to establish IP as a basic module for its undergraduate course. IPOS also participated actively in career fairs held annually at the local universities, for the purpose of enthusing undergraduates on the career prospects in the IP industry.

Conclusion for Enabler 1: Skilled manpower resources networked to the region and beyond

- 1.5.9 The past and existing schemes to nurture a pool of IP professionals have supported the development of our IP ecosystem to its present state. However, as the IP ecosystem progresses and places **greater emphasis on IP management (IPM), strategy and commercialisation, new skillsets must be introduced to support new business demands.**

1.6 Enabler 2: A conducive and progressive environment for IP activities

- 1.6.1 This second Enabler encourages the perception of Singapore as the go-to destination for IP activities, to attract companies and professionals from around the world to locate their IP functions here. It is envisaged that by bringing

⁶ As of 5 Jan 2017.

⁷ As of 5 Jan 2017.

together various players in the IP ecosystem, a critical mass of IP activities that create value for Singapore can be sustained.

Recommendation 16: Implement an IP Box or similar tax regime to provide greater transparency and certainty in Singapore's IP tax regime.

- 1.6.1 An IP Box is a taxation scheme that grants preferential tax treatment for income derived from IP (e.g., licensing and royalty income). It is increasingly popular among developed countries, and an IP Box (or similar) scheme can be found in countries such as Ireland, the United Kingdom (UK), Korea and China.
- 1.6.2 The Organisation for Economic Co-operation and Development (OECD) reviewed "harmful tax practices", such as preferential tax regimes which allow companies to shift profits to benefit from reduced tax rates. It has come to an agreement on the conditions necessary for IP Boxes so that it does not result in harmful tax practices. We can now assess the suitability of an IP Box for Singapore.

Recommendation 17: Establish flagship IP and innovation-related conferences and host international IP conferences in Singapore, to advance and enrich IP discourse in Asia.

- 1.6.3 IPOS' annual IP Week @ SG brings together leading IP practitioners, business leaders, policy makers and thought leaders to network and discuss the latest trends and developments in IP. Every two years, the Global Forum on IP (GFIP) is held in conjunction with IP Week @ SG.
- 1.6.4 This flagship event has proven to be extremely well-received. In the 2016 event, more than 2,200 participants from 30 countries attended the event.

Recommendation 18: Convene an international advisory panel to guide the development of Singapore as a Global IP Hub in Asia.

- 1.6.5 This recommendation is still being looked into.

Recommendation 19: Encourage more Asia-centric, multi-disciplinary IP research in Singapore.

- 1.6.6 Singapore is now home to two eminent research centres. The Centre for Law & Business (CLB) in the National University of Singapore (NUS)'s Faculty of Law focuses on "... *comparative law... which includes examining the extent to which legal convergence is taking place in a globalised and interconnected world*". IP law and policy is one of its areas of interest. For example, it organised an ASEAN IP Public Conference in 2015.
- 1.6.7 The Applied Research Centre for Intellectual Assets and the Law in Asia (ARCIALA), launched in May 2015, is based in the Singapore Management University (SMU). ARCIALA aims to "*position itself as a centre of excellence for applied knowledge on developments in the IP scene in Asia and the rest of the world*". Its achievements include a book project on "IP Exhaustion and Parallel Imports: Critical and Comparative Perspectives", and another on "The Law and Practice of Trademark Transactions: A Global and Local Outlook".

Conclusion for Enabler 2: A conducive and progressive environment for IP activities

1.6.8 Singapore has done well in establishing itself as a **leading IP destination in the region**. The annual IP Week @ SG continues to be a key IP event that has built international traction, and draws illustrious attendees. The research centres, though still young, have gained a strong reputation for their work on IP policy and law.

1.7 Summary

1.7.1 Guided by the IP Hub Master Plan, Singapore has built upon a strong IP regime to develop extensive international linkages to capture high-value work in the international IP flow. **We are now preparing to focus on helping innovative enterprises grow their businesses through IP**. We need to help them integrate IP considerations into their innovation and business development plan – beyond filing for IP protection to IP commercialisation activities. The next phase of the IP Hub Master Plan will focus on such value-generating IP activities.

1.7.2 The need for stronger IP commercialisation capability and results is brought into sharper focus as a result of the work of the Committee on the Future Economy (CFE). The Committee recognised the importance of IP in bringing about more economic benefits for Singapore. IP management and transactions will be critical to ensure that our investments in various national plans such as the S\$19 billion Research, Innovation and Enterprise 2020 (RIE2020), Smart Nation, and Design 2025 to deliver more economic benefits for Singapore.

1.7.3 **Our ability to commercialise IP will be a key contributor to Singapore's growth in the future economy**. This will be the focus for the country as we move into the next phase of the IP Hub Master Plan.

SECTION 2

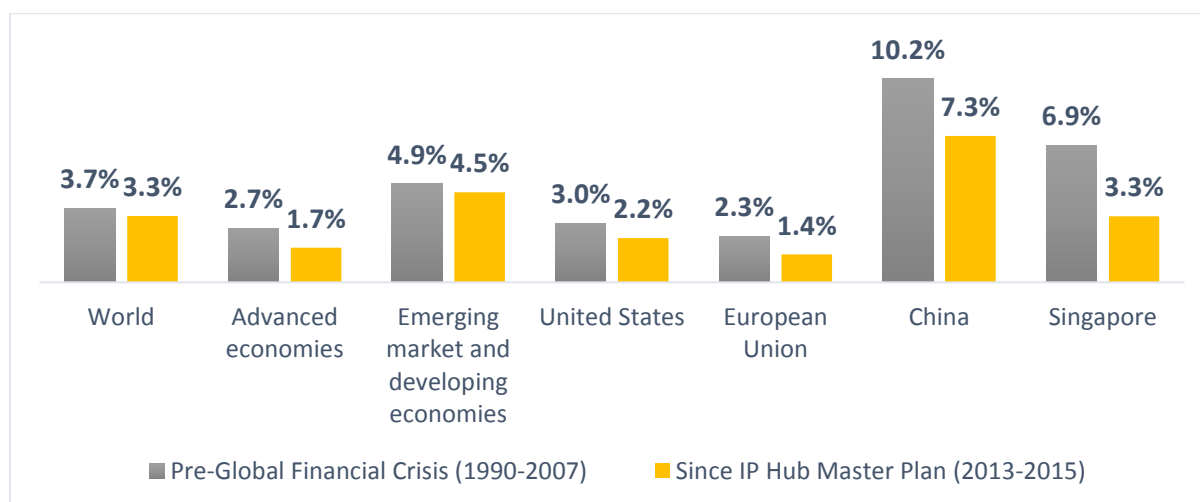
UPDATE ON GLOBAL DEVELOPMENTS AND TRENDS

2.1 Overview

2.1.1 Since the publication of the IP Hub Master Plan in 2013, global economic growth have remained sluggish. In contrast to the period prior to the global financial crisis, Gross Domestic Product (GDP) growth came in lower for advanced economies, emerging market economies, and in key markets like the US, European Union (EU), and China.

2.1.2 Legacy issues from the banking crisis, China's transition towards a slower growth path after a decade of strong credit and investment growth, and longer-term demographic and labour-market trends in advanced economies (as well as for some emerging economies) had hampered growth. Against this external backdrop, Singapore's economic growth had also slowed but had performed well relative to other advanced economies.

Figure 1. Below-trend GDP Growth.⁸

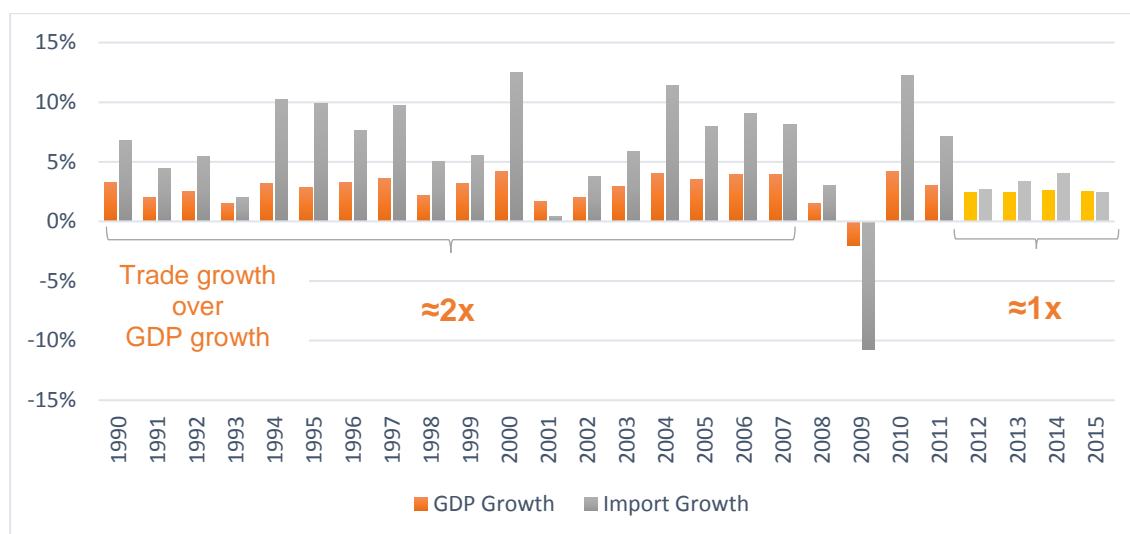


2.1.3 Trade growth, relative to both historical levels and overall economic growth, have also slowed. Between 1990 and 2007, world trade grew on average twice as fast as global GDP. However, between 2012 and 2015, world trade grew at roughly the same pace as GDP. The likely factors for the weakened growth in global trade include the slower pace of trade liberalisation accompanied by the uptick in protectionism, the decline in the growth of global value chains, and the effects of digital trade.⁹

⁸ International Monetary Fund (IMF), October 2016. GDP, constant prices.

⁹ IMF, October 2016. *World Economic Outlook, Chapter 2. Global Trade: What's Behind the Slowdown.*

Figure 2. World GDP and Trade Growth.¹⁰



2.1.4 With the decline in global demand and trade growth, **governments are increasingly turning to innovation for continued competitiveness and economic progress**. The importance of harnessing innovation has been further reinforced by the exponential advances in new technologies and a digitally connected global economy, which have disrupted traditional industries and created new markets of innovative products and services.

2.1.5 These new markets are also increasingly digital. The digital economy – the production and consumption of digital products, services, and platforms, and any business activity that is enabled by such technologies – is sizable. It is estimated to represent 22.5 per cent of global GDP in 2015.¹¹ Growth of digitisation, and in proxy the digital economy, could also be observed from the exponential growth in the volumes of data being created and exchanged globally.

2.1.6 Technology startups are best adapted to flourish in the digital economy. Digitisation enable greater participation by small enterprises and individuals in innovation and globalisation. Examples of high-growth technology startups that have disrupted and replaced traditional products and processes abound: Kodak by digital cameras; Borders Books by Amazon; Tower Records by iTunes and Spotify; hotel chains by Airbnb; taxis by Uber; newspapers by social media; retail stores by e-commerce. Many of the business models of these technology companies are also ‘(physical) asset-light’ – either by providing digital products and services (e.g., Spotify) or by facilitating the use of physical assets that are not owned by the business (e.g., Airbnb).¹² That the value of Standard & Poor (S&P)’s 500 companies are increasingly made up of intangible assets rather than physical assets is evident of this shift.¹³

2.1.7 Countries able to innovate and capitalise on the shifting demands of the new economy will be in a better position to succeed in the current global economic

¹⁰ IMF, October 2016. GDP, constant prices, market exchange rate & volume of imports of goods and services.

¹¹ Accenture Strategy, 2015. *Digital Disruption: The Growth Multiplier*.

¹² Compass, August 2015. *The Global Start-up Ecosystem Ranking 2015*.

¹³ Ocean Tomo LLC, March 2015. *Study of Intangible Asset Market Value*.

slowdown. The remaining section updates the global innovation and IP landscape since the IP Hub Master Plan 2013, and highlights how innovative activities worldwide have continued to surge in areas such as R&D expenditure, business investment in intangible assets, the creation and exchange of data, intangible asset share of firm value, IP share of total trade, global IP filings, and propensity of IP disputes amongst technology firms.

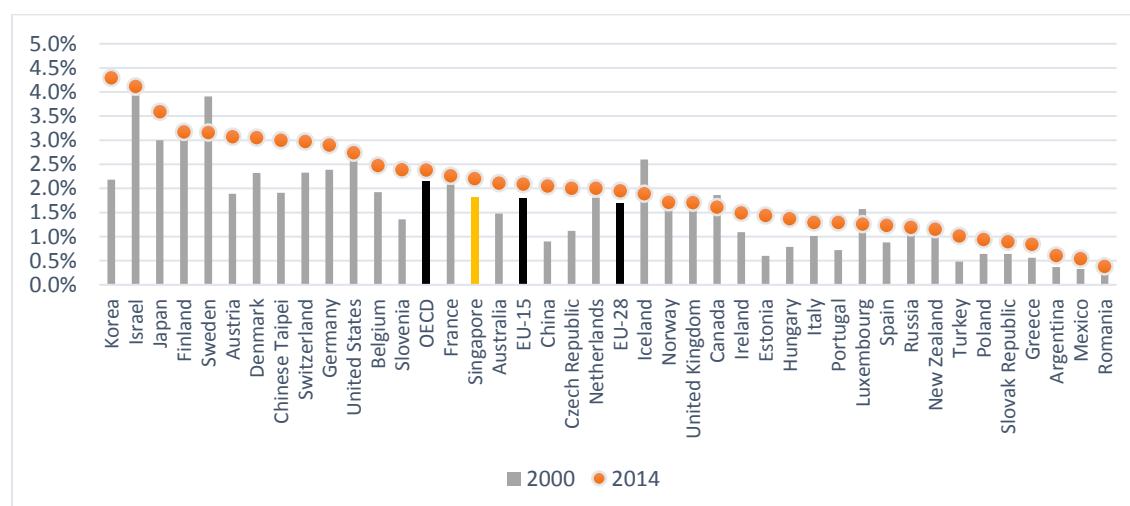
2.2 Surveying the global innovation and IP landscape

Increase in R&D expenditure as a share of economic activity: Asia takes the lead

2.2.1 First, notwithstanding the downturn in the global economy, Gross Expenditure in R&D (GERD) as a percentage of GDP have increased in most countries since the start of the century. In 2014, OECD countries saw GERD as a percentage of GDP increasing to 2.4 per cent from 2.1 per cent in 2000. OECD governments continued to direct more resources to R&D as compared to the pre-banking crisis level in 2007.

2.2.2 Second, Asian countries were also amongst the most R&D focused. A significant portion of the increase in R&D activity took place in Asia. China's GERD as a percentage of GDP increased from 0.9 per cent in 2000 to 2.1 per cent in 2014. In Purchasing Power Parity (PPP) terms¹⁴, this represented an increase from US\$41 billion in 2000 to US\$345 billion in 2014. This is compared to US\$337 billion invested in the EU-28 countries in 2014 and US\$433 billion invested in the US in 2013. In terms of R&D intensity, Korea had the highest GERD as a percentage of GDP at 4.3 per cent in 2014 (US\$73 billion). Japan was the third highest at 3.6 per cent of GDP (US\$159 billion).

Figure 3. GERD as percentage of GDP (select countries).¹⁵



2.2.3 Singapore's GERD as a percentage of GDP increased from 1.8 per cent of GDP in 2000 to 2.2 per cent in 2014. This represented an increase from US\$3.7 billion in 2000 to US\$9.4 billion in 2014. Singapore's GERD is set to increase

¹⁴ OECD Main Science and Technology Indicators, extracted December 2016. *GERD at constant prices and PPP.*

¹⁵ OECD Main Science and Technology Indicators, extracted December 2016. *GERD as a percentage of GDP in 2000 and 2014 (or closest year if unavailable).*

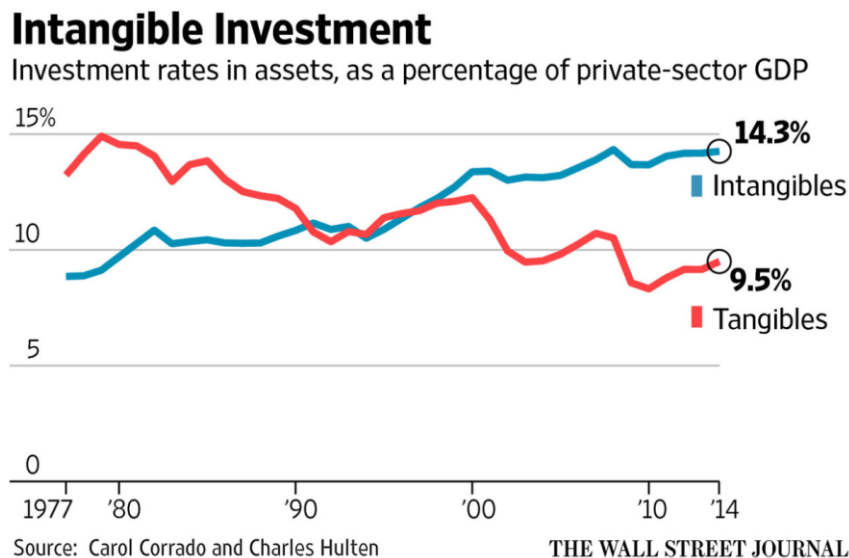
further with the Singapore Government’s commitment to invest S\$19 billion under the RIE2020 Plan. This is S\$3 billion more than the amount committed under the earlier RIE2015 Plan.

Increase in business investment in intangible assets

2.2.4 Studies based on a widely-cited framework¹⁶ have found that business investments in intangible assets that contributed to innovation were significant and had outpaced business investments in tangible assets both in the US and the UK.

2.2.5 In the US, it was found that since the late 1970s, investments in intangible assets as a percentage of private-sector GDP had been increasing steadily as investment rates in tangible assets declined. By the early 1990s, investment in intangible assets exceeded that of tangible assets. In 2014, US business investment in intangibles stood at 14.3 per cent of private-sector GDP vis-à-vis 9.5 per cent for tangible assets.

Figure 4. US Business Investment Rates, 1977-2014.¹⁷



2.2.6 Beyond the US, the trajectory in intangible investments saw similar trend in other developed jurisdictions such as in the UK. A recent study commissioned by the United Kingdom Intellectual Property Office (UKIPO)¹⁸ found that UK market sector investment in intangible assets exceeded that for tangible assets since the early 2000s. In 2014, UK investment in intangible assets stood at £133 billion (approximately 7 per cent of UK GDP¹⁹), which was 10 per cent higher than investments in tangible assets. The study further found

¹⁶ Corrado, C, Hulten, C, Sichel, D, August 2005. *Measuring Capital and Technology: An Expanded Framework*.

¹⁷ Wall Street Journal, March 2016. *Accounting’s 21st Century Challenge: How to Value Intangible Assets*.

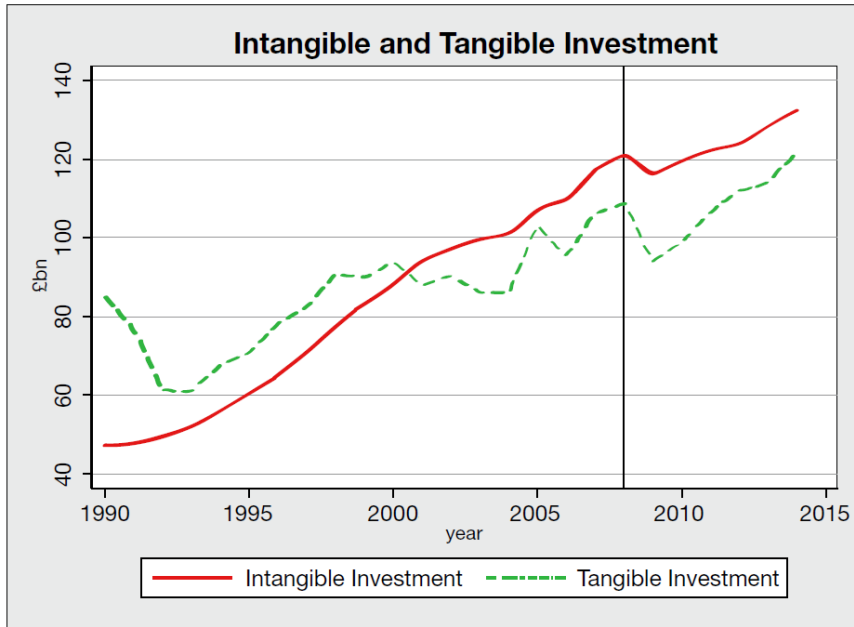
¹⁸ UK IP Office (UKIPO), July 2016. *UK Intangible Investment and Growth: New measures of UK Investment in knowledge assets and IP rights*.

¹⁹ IMF, October 2016. *UK GDP, current prices*.

that £70.4 billion (53 per cent) of UK investment in intangible assets were protected by IP rights.

Figure 5. UK Market Sector Tangible and Intangible Investments, 1990-2014.¹²

Market sector tangible and intangible investment, £bn, 1990-2014



Source: ONS data for tangibles, this paper for intangibles. All data in current prices

The growing digital economy

- 2.2.7 The digital economy, viewed as the production and consumption of digital products, services, and platforms, and any business activity that is enabled by such technologies, is large and growing. Accenture estimated the size of the digital economy in 2015 to be at US\$19.2 trillion, or 22.5 per cent of global GDP and. It is further projected to grow to US\$24.6 trillion, or 25 per cent of global GDP, by 2020.²⁰
- 2.2.8 The growth of the digital economy could be seen from the amount of data created and exchanged globally. A study conducted by the International Data Corporation (IDC)²¹ estimated that the volume of data created globally increased by 34 times to 4.4 trillion gigabytes in 2013 in less than ten years. It further projected that 60 per cent of global data would be created in emerging markets like China and India by 2020.²²
- 2.2.9 In a separate study, the McKinsey Global Institute (MGI)²³ estimated that global data flows (used cross-border bandwidth) had increased 45 times between 2005 and 2014. Digitisation would enable greater participation by both

²⁰ Accenture Strategy, 2015. *Digital Disruption: The Growth Multiplier*.

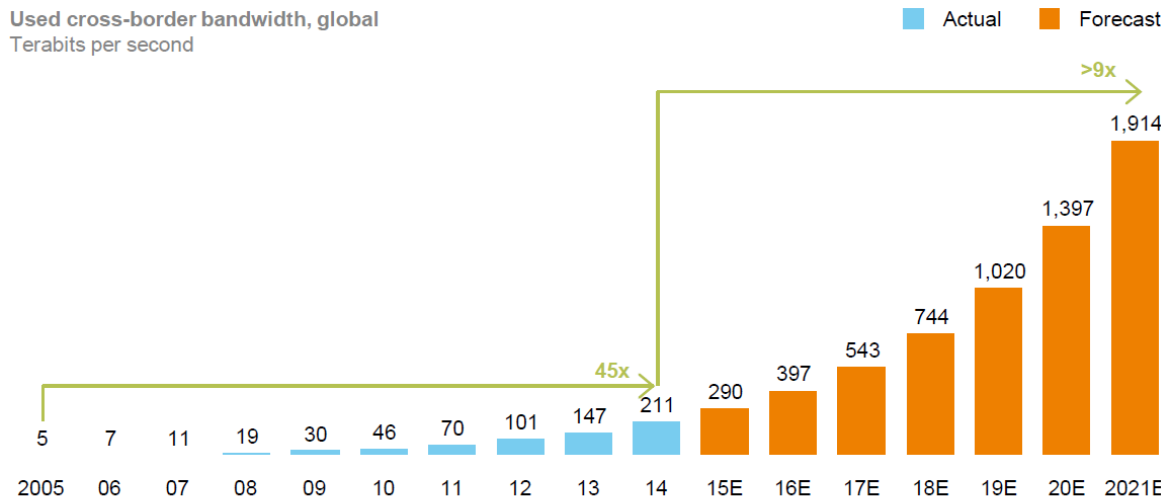
²¹ Founded in 1964, the IDC is a global provider of market intelligence, advisory services, and events for the information technology (IT), telecommunications and consumer technology markets.

²² EMC² with research and analysis by IDC, April 2014. *The Digital Universe of Opportunities*.

²³ The McKinsey Global Institute (MGI) is the business and economics research arm of global management consultancy firm McKinsey & Company.

emerging economies as well as small enterprises and individuals in globalisation and innovation.²⁴

Figure 6. Global data flows.¹⁸



SOURCE: TeleGeography, Global Bandwidth Forecast Service; McKinsey Global Institute analysis

Increase in the intangible component of S&P 500 companies' market value

2.2.10 According to a study conducted by Ocean Tomo LLC²⁵, 87 per cent of the market value of S&P 500 companies were attributed to intangible assets in 2015.²⁶ The study concluded that the market value of the world's top performing companies²⁷, including the likes of Apple, Microsoft, Amazon, and Facebook, were not in buildings or machinery but rather in intangible assets such as patents, brands, data, and algorithms.

²⁴ MGI, March 2016. *Digital Globalisation: The New Era of Global Flows*.

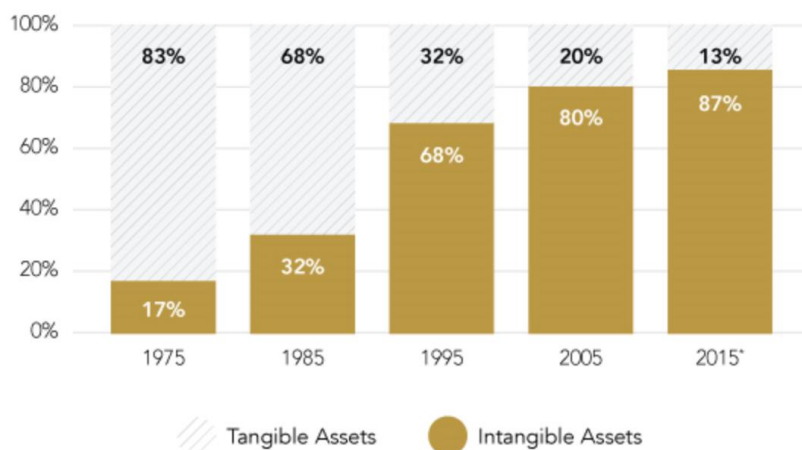
²⁵ Established in 2003, Ocean Tomo LLC provides opinion, management and advisory services centred on IP assets.

²⁶ Ocean Tomo LLC, March 2015. *Study of Intangible Asset Market Value*.

²⁷ The S&P 500 is a US market-capitalisation-weighted stock market index and includes 500 of the top companies listed in the US stock market.

Figure 7. Tangible and Intangible Component of S&P 500 Market Value, 1975-2015.²⁰

COMPONENTS of S&P 500 MARKET VALUE



SOURCE: OCEAN TOMO, LLC

2.2.11 Based on a study of over 57,000 companies around the world, a 2016 Brand Finance²⁸ report estimated that 47 per cent of global enterprise value²⁹ were in intangible assets.³⁰ Denmark, Belgium, and the US were amongst the top three countries with the highest composition of intangible assets, with around 60 per cent of enterprise value in intangible assets in 2015.

2.2.12 Closer to Singapore, economies like Taiwan and South Korea were among the highest in terms of intangible asset value growth, averaging around 50 per cent growth between 2010 and 2015. Singapore companies were estimated to hold about 20 per cent of enterprise value in intangible assets, with growth of around 10 per cent between 2010 and 2015.

Increase in trade flows related to use of IP

2.2.13 Charges for the use of IP – the cross-border transfers of royalties, licensing fees and other charges for the use of IPs like patents, industrial designs, manufacturing rights, trademarks and franchises – had increased both in absolute values (nominal terms³¹) and as a share of trade.

2.2.14 In 2014, global receipts stood at US\$328.9 billion or 1.4 per cent of global exports, marking a considerable increase from US\$91.3 billion or 1.1 per cent in 2000. For OECD countries, receipts were at US\$320.4 billion or 2.3 per cent of OECD exports in 2014, as compared to US\$90.4 billion or 1.6 per cent in 2000.

²⁸ Founded in 1996, Brand Finance is a leading independent branded business valuation and strategy consultancy. It is headquartered in London and has a presence in over 20 countries.

²⁹ Total of market capitalisation and net debt.

³⁰ Brand Finance, May 2016. *Global Intangible Financial Tracker (GIFT) 2016*.

³¹ Values shown do not take into consideration inflation.

Figure 8. Charges for the use of IP receipts as a percentage of exports (select countries).³²

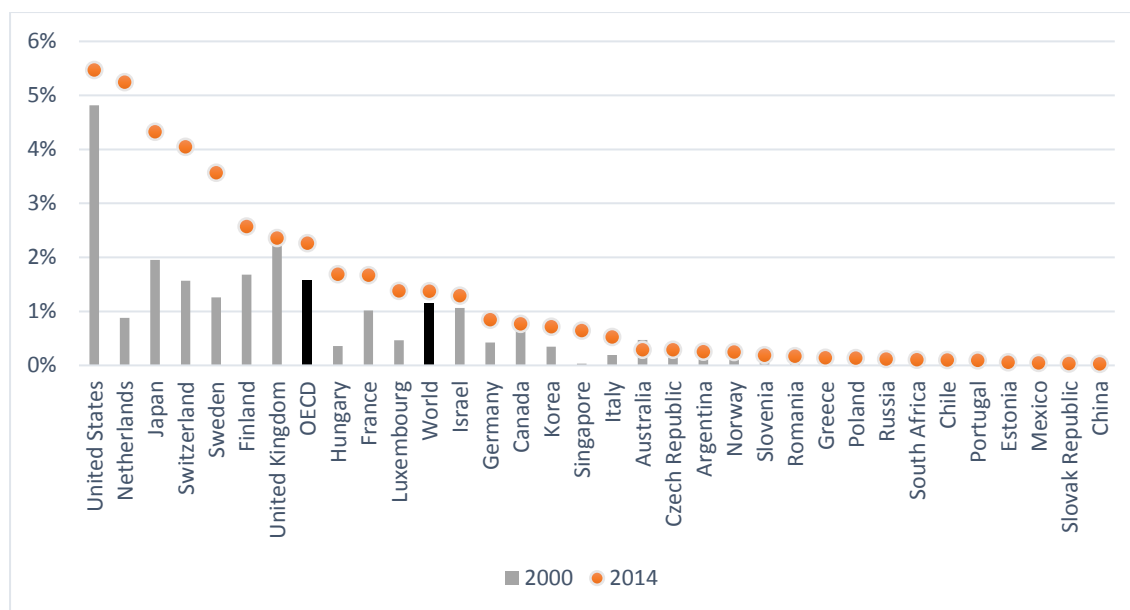
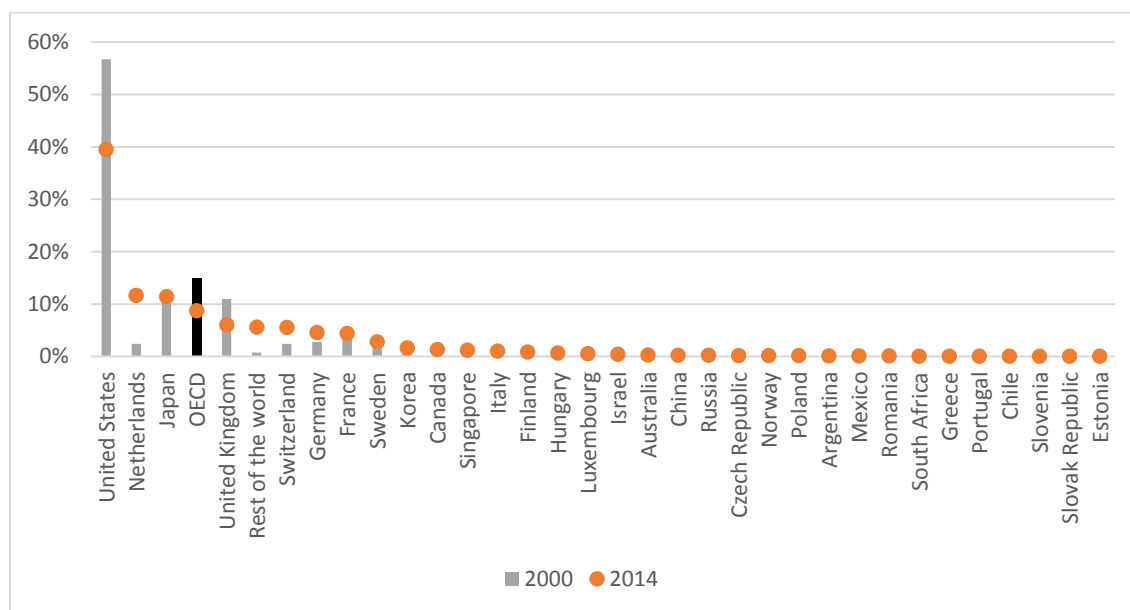


Figure 9. Charges for the use of IP receipts as a share of global receipts (select countries).²⁶



2.2.15 The US had consistently been the largest recipient of IP receipts. In 2014, close to 40 per cent of global receipts, or US\$129.9 billion, were received for the use

³² World Bank World Development Indicators, extracted January 2017. *Charges for the use of IP, receipts, (BoP, current US\$) over exports of goods and services (BoP, current US\$)*, 'World' and 'OECD' are aggregates of countries with available data, noting that not all countries have data in all years, selected countries are OECD and key non-OECD countries with data in 2000 and 2014 (OECD countries excluded due to unavailable data include Austria, Belgium, Denmark, Iceland, Ireland, New Zealand, Spain, and Turkey).

of IP held in the US. Japan maintained its share of global receipts at 11.4 per cent.

2.2.16 Singapore's IP receipts, while modest, had also increased steadily. In nominal terms, receipts stood at US\$3.8 billion in 2014, as compared to US\$61.4 million in 2000. This represented an increase from 0.07 per cent share of global receipts in 2000 to 1.1 per cent share in 2014. As a share of Singapore's exports, receipts had also increased from 0.03 per cent in 2000 to 0.6 per cent in 2014.

Increase in global IP filings: Asia overtakes the rest of the world

2.2.17 With the global emphasis on innovation, businesses and innovators worldwide have sought to protect and capture value of their investments through the IP system. In 2015, around 2.9 million patent applicants, 6.0 million trademark applications, and close to 0.9 million industrial design applications were filed globally.³³ Since the publication of the IP Hub Master Plan, global patent and trademark filings grew 7.0 per cent and 9.8 per cent on average.³⁴

³³ 8.45 million trademark filings worldwide by class counts, and 1.14 million industrial design filings by design counts.

³⁴ WIPO, extracted December 2016. *2013-2015 compounded annual grow rate, global patent, trademark, and industrial design filings.*

Figure 10. World patent filings and GDP growth.³⁵

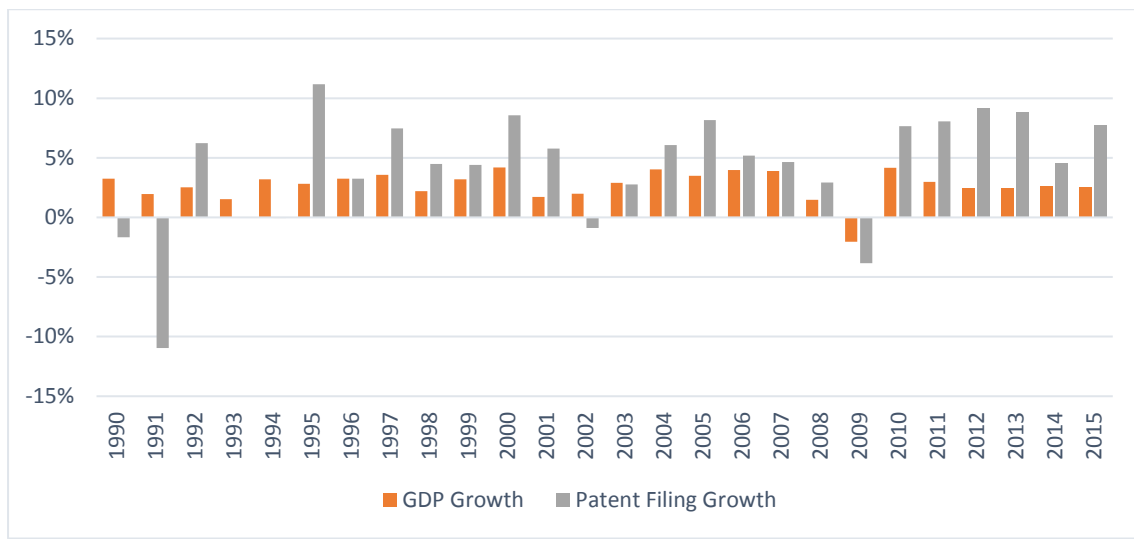
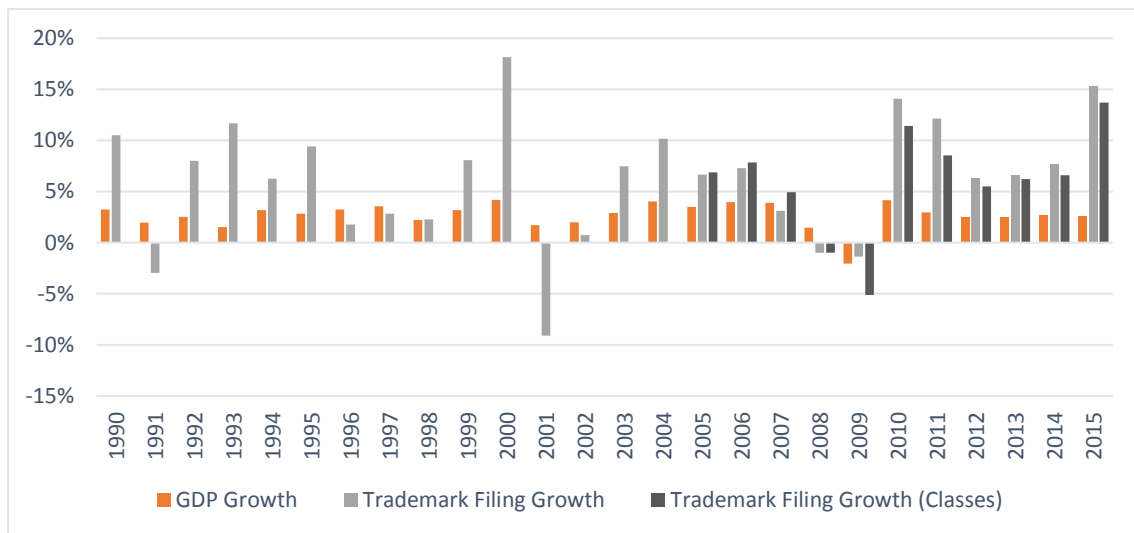


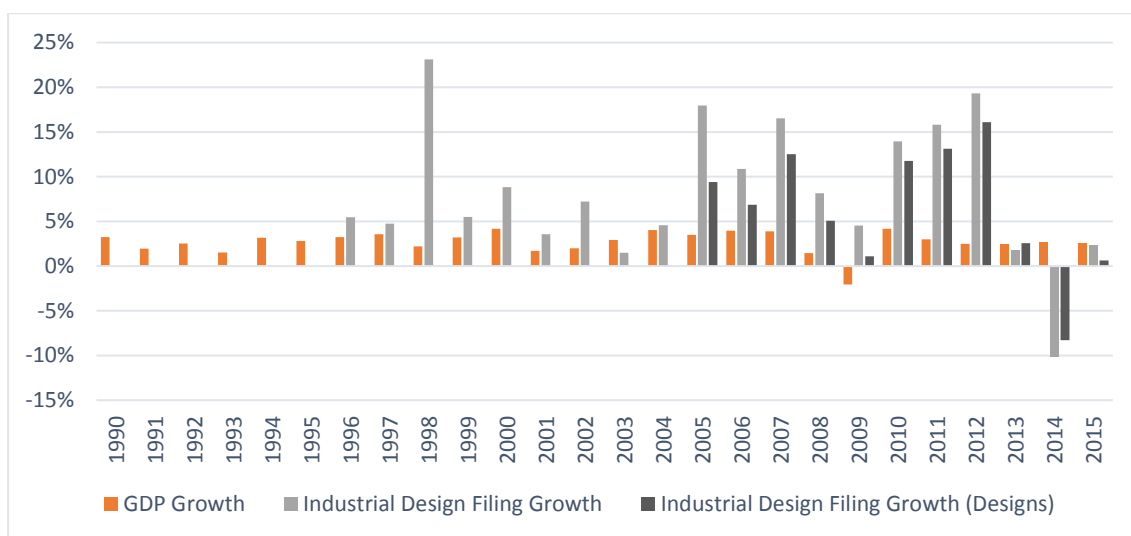
Figure 11. World trademark filings and GDP growth.³⁶



³⁵ WIPO, extracted December 2016. *Global patent filings*. IMF, October 2016. *World GDP, constant prices, market exchange rate*.

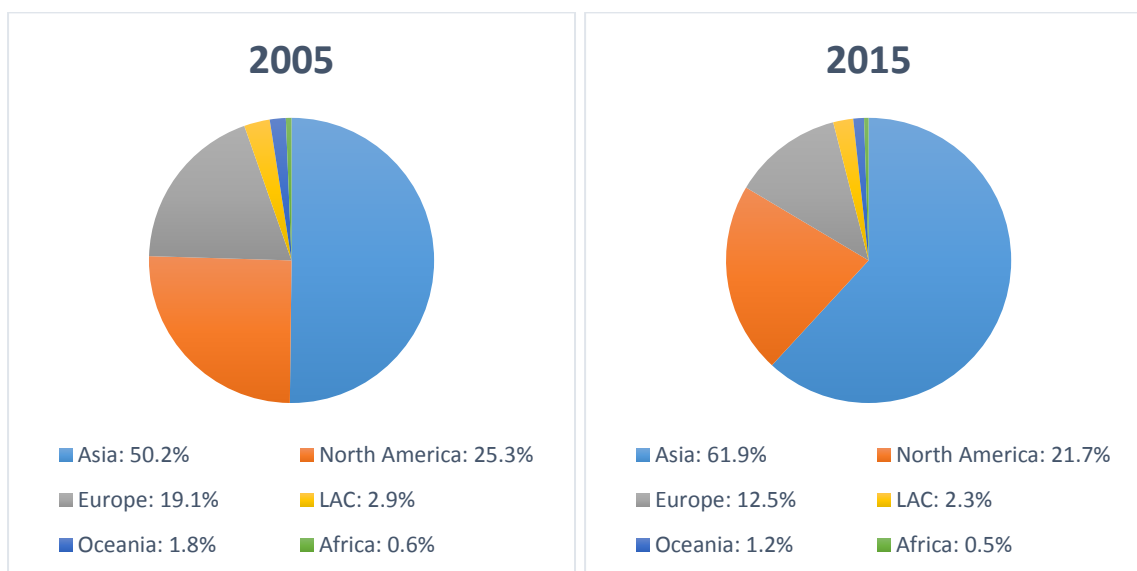
³⁶ WIPO, extracted December 2016. *Global trademark filings by applications and class counts (classes data available from 2004)*. IMF, October 2016. *World GDP, constant prices, market exchange rate*.

Figure 12. World industrial design filings and GDP growth.³⁷



2.2.18 Asia has overtaken the rest of the world in its share of IP filings. In 2015, 62 per cent of global patent filing activity, 55 per cent of global trademark filing activity (by class counts), and 68 per cent of industrial design filing activity (by design counts) took place in Asia, up from 50 per cent, 35 per cent, and 49 per cent in 2005 respectively. For patents, China, Japan, and Korea contributed to Asia’s dominant share. The three countries accounted for 38 per cent, 11 per cent, and 7 per cent of global patent filings in 2015 respectively. China accounted for a significant proportion of global patent filing growth. Between 2005 and 2015, patents filed in China increased 6.4 times. This is compared with filings in the rest of the world which increased 1.2 times.

Figure 13. Patent filing activity by region.³⁸

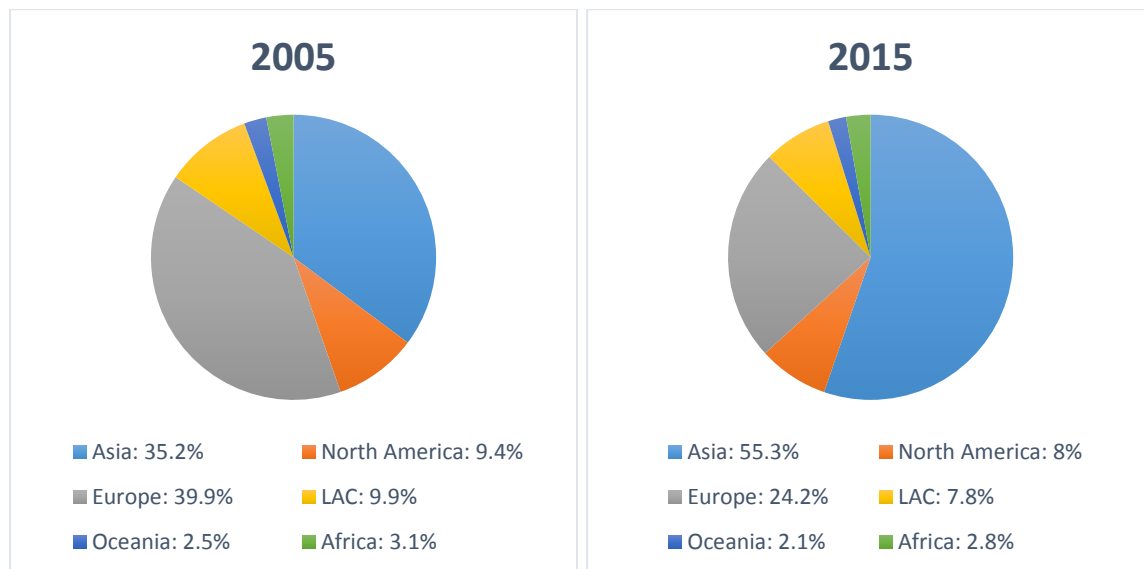


³⁷ WIPO, extracted December 2016. *Global industrial design filings by applications and design counts (filings data available from 1995 and filings by number of designs from 2004)*. IMF, October 2016. *World GDP, constant prices, market exchange rate*.

³⁸ WIPO, extracted December 2016 (LAC: Latin American and the Caribbean).

2.2.19 For trademarks, China, Japan, India, and Korea were amongst the top 10 filing destinations globally. The four countries accounted for 33 per cent, 4.1 per cent, 3.4 per cent, and 2.8 per cent of global trademark filings in 2015 respectively. Similar to patents, China accounted for a significant portion of global trademark filing growth. Between 2005 and 2015, trademarks filed in China increased 4.2 times. This is compared with filings in the rest of the world which increased 1.3 times.

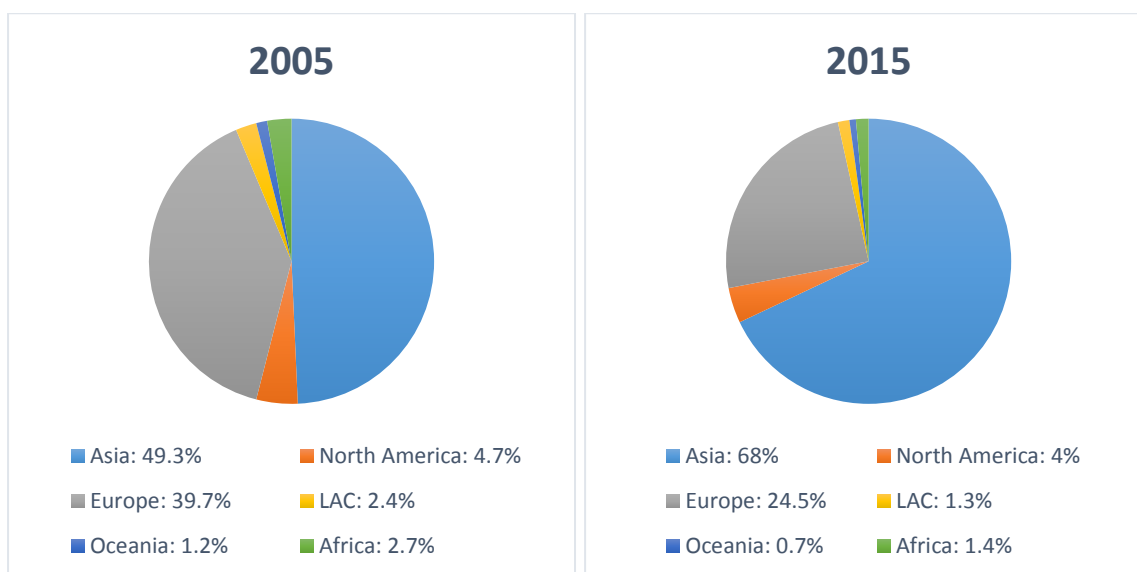
Figure 14. Trademark filing activity (by class counts) by region.³⁹



2.2.20 For industrial designs, China, Korea, and Japan were amongst the top 10 filing destinations globally but China was by-far the largest, having accounted for almost half (49.7 per cent) of global filings in 2015. Korea and Japan accounted for 6.3 per cent and 2.7 per cent of global filings respectively.

³⁹ WIPO, extracted December 2016 (LAC: Latin American and the Caribbean).

Figure 15. Industrial designs filing activity (by design counts) by region.⁴⁰

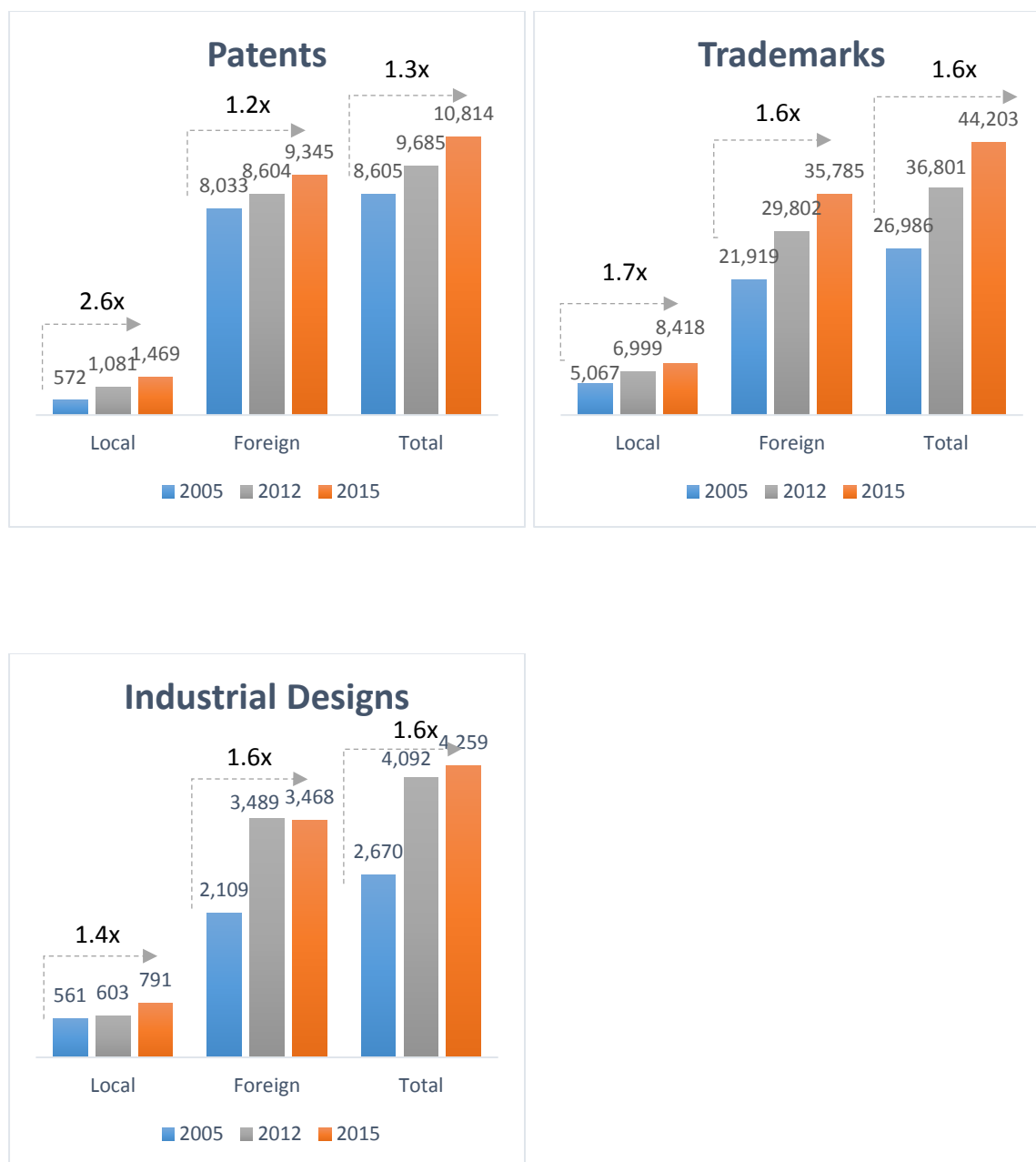


2.2.21 In Singapore, 10,814 patent, 44,203 trademark, and 4,259 industrial design were filed for protection in 2015. Since the publication of the IP Hub Master Plan in 2013, patent, trademark, and industrial design filings grew 3.7 per cent, 6.3 per cent, and 1.3 per cent on average respectively. Patent and industrial design filings made by local applicants also grew at a remarkable 10.8 per cent and 9.5 per cent respectively (local applicant trademark filings grew at the same rate as foreign applicants).⁴¹

⁴⁰ WIPO, extracted December 2016 (LAC: Latin American and the Caribbean).

⁴¹ 2013-2015 compounded annual grow rate, Singapore patent, trademark (by class counts), and industrial design (by design counts) filings, IPOS data; except for industrial designs (by design counts) designating Singapore under the Hague system which was sourced from WIPO, extracted December 2016.

Figure 16. Patent, trademark (by class counts) and industrial design (by design counts) filings filed in Singapore by applicant origin.⁴²



Most disputes encountered by technology firms worldwide were in IP matters

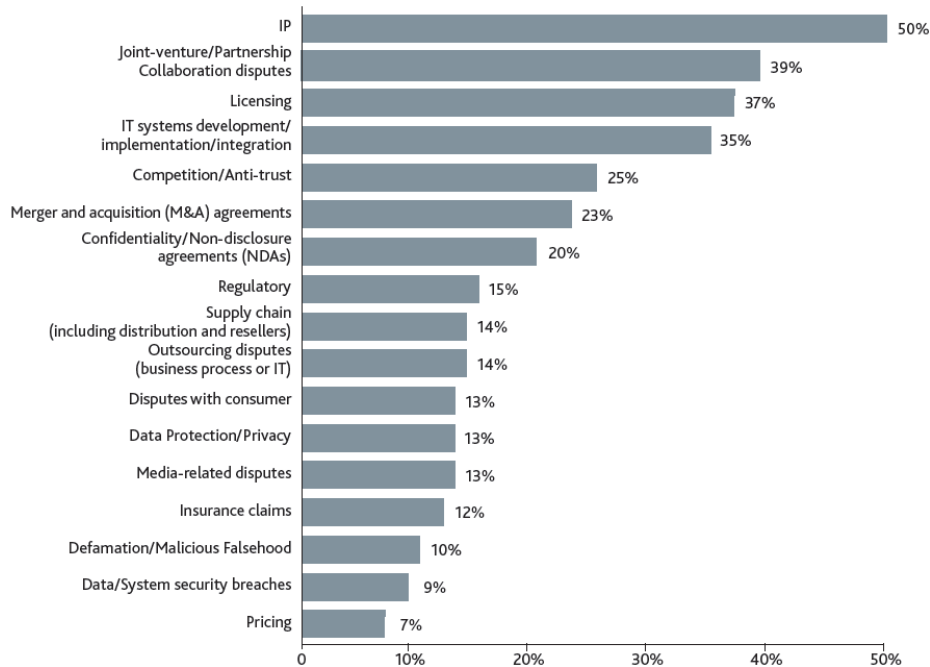
2.2.22 With the greater business emphasis on the use of the IP system to protect innovation and capture value, IP issues have become the most frequent source of disputes encountered by users and suppliers of technology worldwide.⁴³ A

⁴² IPOS data; except for industrial designs (by design counts) designating Singapore under the Hague system which was sourced from WIPO, extracted December 2016.

⁴³ Queen Mary University of London, November 2016. *Pre-empting and Resolving Technology, Media and Telecoms Disputes*.

2016 global survey⁴⁴ found that IP matters were ranked by 50 per cent of respondents as the most common type of dispute. Technology firms are increasingly asserting IP rights to defend and exploit innovations in technology-intensive sectors.

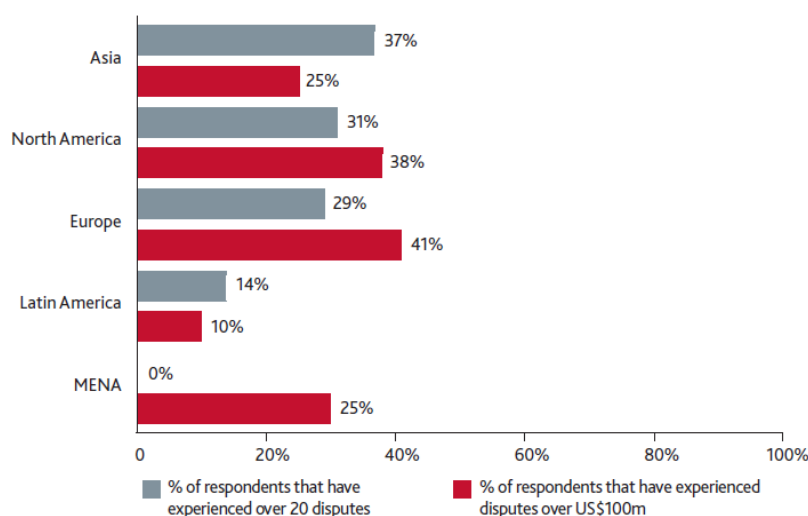
Figure 17. Types of dispute encountered by users and suppliers of technology in the last five years.³⁷



2.2.23 The survey also found that most of the disputes (all types of disputes, including IP matters) took place in Asia, with 37 per cent of respondents having experienced 20 or more disputes in Asia in the past five years. However, most of the high-value disputes (of more than US\$100 million) took place in Europe and North America.

⁴⁴ The survey was built on 343 questionnaires and 62 personal interviews of global respondents in the Technology, Media and Telecoms domains.

Figure 18. Regions with high-value or high-frequency of disputes.³⁷



2.3 Summary

2.3.1 The global trends presented in this section depict a sizable and growing focus on innovation across countries. Whilst advanced economies especially the US continue to be global innovation leaders, the data suggests a strong pivot towards Asia. Rapid technological advances and digitisation have enabled new technology startups to disrupt and replace traditional industries. **Innovative companies of the future will be increasingly IP-rich and physical asset-light.** Their ability to protect, manage and maximise value from their IP will be a key determinant of success. For example, an IPOS study on manufacturing industries in Singapore found that industries which generated a higher share of R&D-related revenue were the ones which had utilised the patent system more. The next section will discuss how IP supports the innovation cycle as Singapore gears up for the future economy.

SECTION 3

GEARING UP FOR THE FUTURE ECONOMY

3.1 Preparing Singapore for the future economy

- 3.1.1 Singapore is in a good position to succeed in the future economy. It is today the world's easiest place to do business,⁴⁵ and the most network-ready country.⁴⁶ Its strong reputation for transparency, pro-business policies, and trusted legal and corporate governance systems⁴⁷ have made Singapore the top investment destination in Asia⁴⁸ and the regional hub for industries such as business services, financial services and transport.
- 3.1.2 On 1 October 2015, the government announced the setting up of CFE to examine ways in which Singapore's economy could remain competitive amidst a changing regional and global environment. Productivity and innovation have been identified as key to driving Singapore's economic growth. To remain resilient in an unpredictable global political climate, enterprises will need to innovate to respond to successive disruptions as a result of technological advancement and globalisation.
- 3.1.3 The OECD defined innovation as, "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations". **Innovation is about bringing ideas to the market.** Intangible asset including databases, know-hows, and IP are key to the success of startups and businesses in driving an innovative economy. An IP right, similar to a title deed, is precursor to enabling innovators and businesses to commercially benefit from it, such as through licensing and product sales.
- 3.1.4 Even prior to the CFE process, the government had in place several initiatives to deepen innovation capabilities in Singapore. There had been several whole-of-government initiatives towards improving productivity and bettering Singaporeans' lives through programmes such as the Smart Nation initiative in November 2014 and Design 2025 plan in March 2016. Further, the government has committed to increasing public investment in research and innovation to S\$19 billion under the five-year RIE2020 Plan.⁴⁹
- 3.1.5 Other than investing in R&D, there has been a recognition that startups are important in driving innovation, as they help to fuel the growth of high-tech industries. For example, startups support the translation of nascent technologies from universities and other non-profit research organisation into

⁴⁵ Doing Business 2015 Report by World Bank. Singapore was ranked first, followed by New Zealand, Hong Kong and Denmark.

⁴⁶ World Economic Forum, 2016. *Global IT Report 2016*.

⁴⁷ Singapore scored top in the world for the "Institutions", "Infrastructure" and "Business sophistication" pillars in the Global Innovation Index (GII) 2016 rankings. These includes sub-pillars such as political and regulatory environment, ICT and general infrastructure, and knowledge workers.

⁴⁸ BERI report 2016 (April 2016). Singapore was ranked second after Switzerland, followed by Germany, Norway and Taiwan. It is top ranked in Asia, followed by Taiwan and South Korea (9th).

⁴⁹ The RIE2020 Plan seeks to support and translate research into solutions that address national challenges, build up innovation and technology adoption in companies, thereby driving economic growth through value creation. The S\$19 billion budget is an 18 per cent increase from the S\$16.1 billion committed at the RIE2015 Plan.

the market. A study of over 202 US universities and colleges, hospitals and research institutions, national laboratories, and third-party technology investment firms found that, in 2015 alone, these entities on average started five companies and created four to five new products that had over US\$140 million in sales.⁵⁰

- 3.1.6 The total number of startups in Singapore has more than doubled from 22,000 in 2003 to 48,000 in 2015. Specifically, those in the high-technology sectors has increased by 70 per cent from 2,800 to 4,800 during the same period. Tech-enabled startups are projected to account for 2 per cent of Singapore's GDP by 2035.⁵¹ They are also estimated to employ more than 168,000 jobs in 2035, up from 5,000 in 2015.⁵²
- 3.1.7 Our startups are supported through government-initiated development of infrastructure in incubation clusters such as at Jurong Town Corporation (JTC) LaunchPad @ one-north and Launchpad @ Jurong Innovation District, and Deep Technology Innovation Hub. They are further assisted by government funding and accelerator programmes such as SPRING's Startup Enterprise Development Scheme (SEEDS) and Business Angel Scheme (BAS), and SGInnovate⁵³ respectively. Organisations promoting entrepreneurship such as Action Community for Entrepreneurship (ACE) also act as a network of support for aspiring startups and entrepreneurs through resources, networks, mentorships and overseas access.

3.2 Innovation, IP and our future economy

- 3.2.1 Our IP regime has been updated and strengthened regularly to support innovation. For example, we reviewed the Registered Designs regime in 2016 to support the growth of the design industry.⁵⁴
- 3.2.2 Other than strengthening the IP legal framework for the protection of innovation, the IPOS' patent S&E unit had developed capabilities in patent analytics and technology foresighting over the past two years. These capabilities can help policy-makers and industry extract valuable insights on technological and business developments. By enabling better informed upstream research decisions through IP analytics and technology foresighting, we can achieve better commercialisation outcomes from R&D.
- 3.2.3 In translating ideas to the market, there is a pressing need for IPM expertise. Further, studies have shown that industries with above-average usage of IP pay a premium income of almost 30 per cent more than those from other industries. These include traditional IP jobs such as patent agents and business

⁵⁰ Association of University Technology Managers (AUTM) Licensing Survey 2015.

⁵¹ This is defined as a young company that is designed for high growth, using enabling technology which is an invention or innovation that upon application can bring significant transformation in what a user is able to do.

⁵² PricewaterhouseCoopers (PWC), April 2015. *Singapore's Tech-Enabled Startup ecosystem*.

⁵³ SGInnovate promotes startups in new and existing industries, and works with entrepreneurs to build, commercialise and scale technology-based innovation in deep technology areas such as artificial intelligence and robotics.

⁵⁴ Ministry of Law, 16 Mar 2016. *Registered Designs Regime to Provide Greater Protection and Clarity to Designers*. <https://www.mlaw.gov.sg/news/press-releases/registered-designs-regime--to-provide-greater-protection-and-cla> (accessed Feb 2017).

consultants, as well as more nascent ones including IPM consultants and IP valuers. These IP jobs have significant multiplier effect on the economy through strengthening companies' competitive edge and unlocking the value of their IP. For example, when IBM hired a chief IP officer to manage its IP assets as a strategic function to drive business growth, its IP licensing revenue reached 15 per cent of its income at US\$1.5 billion within a decade, up from just US\$30 million in 1993.

3.3 Areas where Singapore can improve in terms of innovation

- 3.3.1 The strong support given to grow the innovation ecosystem in Singapore is reflected in several international studies such as the Global Innovation Index (GII). The GII 2016 ranked Singapore as top in the world in the Innovation Input Sub-Index, which measures indicators in the national economy that enables innovative activities. The World Economic Forum (WEF) Global Competitiveness Report 2015-2016 also held Singapore's innovation ranking at 9th out of 140 economies.
- 3.3.2 However, the same studies also revealed several areas of improvement for Singapore in terms of producing better innovation outcomes. Our returns to innovation investment do not commensurate with the resources we have put in. For example, the GII found that while Singapore is one of the top ten countries in terms of innovativeness, it is the least innovation efficient amongst them all, ranking 78th on innovation efficiency. (The efficiency ratio measures how much innovation output a country is getting for its inputs.) In monetary terms, it is comparatively more expensive in terms of R&D dollars for a Singapore entity to produce one global patent (approximately S\$1.2 million) as compared to its Japanese (S\$0.6 million) or South Korean (S\$0.43 million) counterparts.
- 3.3.3 On closer scrutiny, the innovation gaps identified for Singapore in the GII report were in the areas of creation and export of knowledge, reliance on imports of technology, brands and creative works. These findings were consistent not just with GII's past results, but also other international rankings such as the Economist Intelligence Unit (EIU)'s "Creative Productivity Index" published in 2014⁵⁵. The latter noted that Singapore ranked first in terms of creative inputs as measured by its strong political institutions, IP protection, investment protection and contract enforcement, but produced fewer patents, and creative products. The 2016 edition of the Bloomberg Innovation Index also found that while Singapore was ranked 6th amongst 50 countries in terms of innovativeness, it was ranked much lower for R&D intensity (17th) and patent activity (24th). Further, while the value of Singapore's trade receipts of IP royalties and licensing fees had increased to US\$3.8 billion in 2014 from US\$61.4 million in 2000, Singapore remains a net importer of ideas with a negative balance of payment in terms of royalties. There is scope for Singapore to achieve better commercialisation of IP. **We need to produce more world-class products and services.**
- 3.3.4 Beyond innovation outputs such as filing of IPs and producing creative products, there is also a recognition that simply filing for IP is insufficient. The **commercialisation of IP is critical to transforming ideas and new**

⁵⁵ The EIU, August 2014. *Creative Productivity Index*.

technologies to better economic outcomes for Singapore. Our SMEs should be given greater access to government IP. While the sales and licensing revenue generated from commercialised R&D output amongst the private sector in Singapore is S\$25.2 billion and S\$466.7 million respectively, SMEs only account for S\$763.4 million in sales revenue and S\$86.9 million in licensing revenue. In comparison, the public sector generated S\$29.8 million in sales revenue and S\$5.3 million in licensing revenue, in spite of higher R&D expenditure from the public sector as compared to the SMEs.⁵⁶

3.4 Recommendations by CFE pertaining to IP

3.4.1 The CFE recognises the need to equip innovators and entrepreneurs with the requisite IP knowledge to help protect and capture value from innovative activities. The CFE main report released on 9 February 2017 acknowledges that our IP ecosystem needs to be strengthened to better support innovation and technology adoption. This would help enterprises to better commercialise the research findings and IP of our research institutions.

3.4.2 The CFE main report recommends the following IP specific initiatives, namely:

(a) Strengthen our national capabilities to commercialise IP from Institutes of Higher Learning (IHLs) and other research performers. We should consider establishing or bringing in dedicated commercially-oriented entities that are focused on the commercialisation of IP generated from within our IHLs and other research performers based in Singapore. These entities can complement the current Innovation and Enterprise Offices.

(b) Significantly grow the community of IP and commercialisation experts (lawyers, patent attorneys, valuers, managers, strategists) to drive better economic outcomes from innovation. We should also develop IPM capabilities in the public and private sectors to manage and translate innovation and R&D efforts into commercial outcomes.

(c) Develop a standardised IP protocol to be adopted by all public agencies and publicly-funded research performers. This includes the A*STAR research institutes, autonomous universities and hospitals. This will simplify, standardise and shorten IP negotiations between the industry and public research performers or publicly-funded research performers, and speed up collaborations.

(d) Update the IP Hub Master Plan, released in 2013, to support innovation and entrepreneurship. The focus of the IP Hub Master Plan has been on attracting IP-related work and activities to Singapore. Having achieved fair success in this area, it should be updated to also focus on assisting innovators and enterprises to extract value from their IP. This could entail, for example, developing new initiatives in the area of IP transactions and management.

(e) Review Singapore's copyright regime to take into account new ways of creating, distributing, accessing and using content. To support the healthy growth of the creative industries, we need a good copyright regime that balances between providing exclusive rights as an incentive to create and

⁵⁶ Data obtained from the Agency for Science, Technology and Research (A*STAR) National Survey of R&D in Singapore 2014.

disseminate new creative works, and providing access to those works for the benefit of other creators and society at large.

- 3.4.3 In light of the release of the CFE report, it is timely that we take stock of the progress of the 10-year roadmap laid out by the IP Hub Master Plan. An update of the IP Hub Master Plan, that is aligned to the CFE's directions, will help position Singapore's IP ecosystem to better meet the challenges of the future and ride the next wave of economic growth.

SECTION 4

GAPS IN PROPELLING AN INNOVATION-DRIVEN ECONOMY

4.1 Overview

- 4.1.1 From our review of the progress of the original IP Hub Master Plan, it is clear that for Strategic Outcome 2 on being a hub for quality IP filings, Singapore has made significant progress to build a strong, reliable and effective IP regime that is well plugged into the international network. There is also ongoing work being done in relation to Strategic Outcome 3 on being a hub for IP dispute resolution. As observed, for Strategic Outcome 1 on being a hub for IP transactions and management, more effort needs to be devoted to support businesses, and IP owners, to extract value out of their IP. We need to introduce new initiatives or enhance existing ones to assist our innovators and businesses to better manage and transact IP.
- 4.1.2 IPOS undertook a year-long consultation involving key stakeholders from Singapore and overseas to understand the gaps in our innovation ecosystem. In addressing the gaps, we also considered the findings and recommendations of the CFE report and the RIE2020 Plan. Besides referencing international best practices, IPOS commissioned a study on Singapore's IP Transaction and Management ecosystem (IPTM)⁵⁷ in April 2016. The comprehensive study covered a broad spectrum of activities, including eight interviews, five overseas study visits⁵⁸ and six focus group discussions.
- 4.1.3 The study unveiled several gaps in our IP and larger innovation ecosystem, and made a number of concrete recommendations for Singapore to capture greater value from our innovation efforts. **If the proposed measures to boost IP transaction and management activities were implemented, the study estimated conservatively that at least S\$1.5 billion could be added to the Singapore economy over the next five years.**
- 4.1.4 This section presents the key challenges and opportunities as we embark on the next phase of the IP Hub Master Plan. It is organised along the lines of how IP is integral to the innovation cycle in three phases, namely, "IP Creation", "IP Protection" and "IP Commercialisation". Within each phase, the discussion is framed based on three key building blocks, namely, "Expertise", "Regime" and "Marketplace". It outlines the key challenges for Singapore, as summarised in the table below, and will form the basis for the recommended strategies in the next section.

⁵⁷ This study was conducted by Inngot Limited, a UK-based company specialising in IP management and transaction. The principal author of the study was Martin Brassell, who also co-authored a commissioned study by UKIPO on IP finance.

⁵⁸ US was a choice of study as it had a well-established private sector of companies dealing in IP marketing, brokerage and auctions. The UK and Denmark systems were studied given their similarities with Singapore in terms of GDP and population levels. Both countries also had IP agencies that were active in supporting businesses with IP rights management and value realisation. China, Japan and Korea are all known to be Asian countries with a diverse range of government initiatives and strong innovation capabilities, and were studied to understand the policy intent behind their initiatives.

4.2 Challenges for Singapore in “IP Creation”

Expertise	Regime	Marketplace
Gap 1: Poor application of data analytics (e.g., patent information) to ensure innovation success.	Gap 2: Lack of coordination among agencies to support innovative companies.	Gap 3: Absence of strong collaboration within the innovation community.

4.2.1 Innovation is primarily about developing a new idea into a viable product for the market. In the innovation cycle, the value from R&D is contingent on the innovator’s ability to produce good and marketable IP. In the area of IP Creation, the key gaps identified are as follows-

Expertise

Gap 1: Poor application of data analytics (e.g., patent information) to ensure innovation success.

4.2.2 To derive maximum value for the economy, it is important that our R&D efforts are market-driven. This drive towards better market outcomes should be informed by both sound business and technological analysis.

4.2.3 A study of 158 technology-based firms from the US and Germany have shown that firms that use patent analytics outperform their peers in terms of profits. These firms are able to extract higher strategic and financial value from their patent portfolios.⁵⁹ A 2016 Boston Consulting Group (BCG) report of innovative companies found that strong innovators used multiple data sources for new ideas. Of these, patent data was identified as a key source. Strong innovators were 4.6 times more likely to leverage patent data for innovation than weak innovators. These data suggest that technological foresighting and intelligence enables companies to derive greater value from R&D, by informing policy decisions about research space and areas of strategic growth, and enabling innovators to find opportunities and collaborators.

4.2.4 There is also a need to support and equip our policy makers with the capability to understand technology trends through patent analytics. More advanced economies like the US⁶⁰, UK, Japan and Australia have already weaved this requirement into their R&D process.

Regime

Gap 2: Lack of coordination among agencies to support innovative companies.

4.2.5 Various government support is readily available to businesses, such as SPRING’s SEEDS, BAS and Capability Development Grant (CDG), and the Inland Revenue Authority of Singapore (IRAS)’s Productivity and Innovation

⁵⁹ Ernst, H, Conley, J, Omland, N (2016) “How to create commercial value from patents: the role of patent management”, *R&D Management*, Vol 46, pp 677-690.

⁶⁰ Examples would include US’ National Institute of Health and US’ National Aeronautics and Space Administration.

Credit (PIC). Some of these schemes (e.g. CDG and PIC) have an IP specific component while others do not.

- 4.2.6 Further, there are overlaps in the existing support structure by the government. Launched in April 2016, SPRING’s venture debt programme assists companies, which are typically IP-rich but physical asset-light, to expand through mergers and acquisitions. These companies may also apply for loans through the IPFS started in April 2014 and administered by IPOS.

Marketplace

Gap 3: Absence of strong collaboration within the innovation community.

- 4.2.7 There is need for more conversations amongst innovators. Heretofore, innovation agencies have generally worked in silos when greater cooperation will create more opportunities for better economic outcomes.
- 4.2.8 An example is in the treatment of dormant patents. Studies have indicated that dormant patents are a prevalent challenge in economies worldwide, including in Singapore. Various indicators suggest that the concentration of dormant patents worldwide is relatively higher in research organisations and universities at 35-70 per cent as compared to commercial entities at 20-50 per cent. There is scope for Singapore agencies to collaborate and commercialise such patents. For example, the Korean Intellectual Property Office (KIPO) had worked directly with 30 universities and public research institutes to assess commercial applications of more than 3,000 dormant patents since 2010. The results have been promising with 50 inventions being transferred to industries which generated a total of US\$3.8 million in royalties. Further, another 21 inventions were found useful for supporting patent acquisition overseas.
- 4.2.9 If innovators could collaborate more at the IP Creation stage, such as to identify complimentary technologies, it would lead to better commercialisation outcomes.

4.3 Challenges for Singapore in “IP Protection”

Expertise	Regime	Marketplace
<p>Gap 4: Lack of access to IP protection advice.</p> <p>Gap 5: Poor knowledge of IP issues in export markets.</p>	<p>Gap 6: High cost of IP enforcement.</p>	<p>Gap 7: Lack of tools for SMEs to understand and protect their IP.</p>

- 4.3.1 IP protection is important to safeguard businesses’ intellectual assets. The importance of effective use of IP protection can be seen in the example of Trek, a home grown company that started off as a value-added engineering solutions provider.

Trek 2000 International Ltd (Trek) – IP protection as critical for business



Trek 2000 International Limited (“Trek”) is the Singaporean company that created the ThumbDrive®, a thumb-sized universal serial bus (USB) data storage device that revolutionised the way digital data on personal computers is stored and transferred. The publicly-listed company is headquartered in Singapore and has offices in many parts of the world. It was included in the Forbes list of “best small companies in the world” for 2000 and 2002. Other notable international recognition include the ASEAN Business Award for Innovation in 2011, the Asia-Pacific Enterprise Leadership Awards for Spirit of Innovation in 2013, and the SD Association Leadership Award in 2014.

While Trek is successful today, achieving over US\$165 million in annual revenue in 2016, its journey in this highly competitive market is constantly challenged by imitations and replicas.

Trek introduced the ThumbDrive® while its patents were still pending in 36 countries back in 2000. After its launch at a major trade fair in Germany, many similar devices proliferated the market. Trek then fought imitators for close to ten years through patent litigations, out-of-court settlements and licensing agreements. Over the years of enforcing its rights, Trek has gained many valuable lessons in IP rights management.

At the forefront of technology development with 4 per cent of its revenue channelled to R&D, Trek recognises that the continuous development of its IP assets and the effective management of its IP portfolio are critical and crucial to the long-term success of the company. Today, Trek has hundreds of patents granted globally. Trek also utilises its trademarks astutely and holds the ThumbDrive®, FluCard® and Ai-Ball™ marks. Trek’s investment in IP has enhanced its licensing revenue since 2002. Its IP strategy has also enabled the company to grow internationally with over 87% of its revenue generated from outside Singapore.

4.3.2 IP protection is often the premise for the enforcement of IP rights. The effective international protection and enforcement of IP rights is especially important in a globalised market of today, where businesses are seeking to expand aggressively overseas, taking advantage of the bilateral and multilateral free

trade agreements to access bigger markets globally. With the global emphasis on IP, there is an urgency to ensure that our companies retain their competitive edge through good access to IP advisory, as well as support in the event of IP infringement and disputes. The following gaps have been identified in the area of IP Protection as follows-

Expertise

Gap 4: Lack of access to IP protection advice.

- 4.3.3 The IPTM study showed that the awareness of IP strategies amongst SMEs are lacking. Of the service providers interviewed, 85 per cent reported that less than 50 per cent of their new clients understood IP or had a corresponding IP strategy. SMEs need to be equipped with more IP know-hows so that they may infuse IP strategies into their business decisions. The respondents highlighted two issues. First, it was cost inefficient for small establishments to hire a full-time IP expert. Second, it was felt that the current pool of expertise was skewed towards the legal aspect of IP, rather than technical and IP commercialisation advisory.

Gap 5: Poor knowledge of IP issues in export markets.

- 4.3.4 IP protection is critical to companies expanding overseas as the case of Trek has shown. As a small domestic market, companies typically use Singapore as a launch pad to expand into overseas markets. IP rights are territorial in nature and companies would need to obtain IP protection and be sufficiently savvy about IP enforcement in overseas markets. Successful export companies tend to be the ones able to capitalise on their IP to create and maintain a competitive edge abroad. One such example is Ednovation, a Singaporean company with a chain of childcare centres in China. Ednovation had taken conscious steps to protect the core IP of its business. The study, however, finds that many companies still lack sufficient knowledge of foreign IP regimes. There is a need to build expertise that will raise the level of business awareness on IP protection in foreign jurisdictions.

Regime

Gap 6: High cost of IP enforcement.

- 4.3.5 The usefulness of IP protection is anchored on the ability for effective enforcement of IP rights. However, the enforcement of IP can be costly and lengthy. For example, a litigation case pertaining to the use of the “Ku De Ta” trademark in Singapore took five years to conclude. In contrast, IP disputes heard in the UK under the IP Enterprise Court (IPEC), a specialist court within the High Court of Justice, can be concluded generally within 12 months. Further, an applicant could obtain judgment in just over a year from their filing of a patent dispute in the Chinese courts.⁶¹ The cost and time required for IP enforcement often disadvantages SMEs. Hence, to allow SMEs to effectively enforce their

⁶¹ IAM (Jan/Feb 2017) *Defending a patent case in the brave new world of Chinese patent litigation*

IP rights, there is need to put in place an affordable and speedier way of obtaining judgement of IP disputes.

Marketplace

Gap 7: Lack of tools for SMEs to understand and protect their IP.

4.3.6 The IPTM study suggests that companies in Singapore generally do not have a deep IP knowledge. They also have a tendency to pay attention to IP issues only when problems such as IP disputes occur. Further, while SMEs understand the reputational and business benefits of IP, they found it difficult to allocate time and resources for proper IPM. SMEs need to be equipped with the requisite IP and business strategy tools, without the added burden of cost.

4.4 Challenges for Singapore in “IP Commercialisation”

Expertise	Regime	Marketplace
Gap 8: Lack of IP commercialisation expertise.	<p>Gap 9: Outdated funding models for innovative companies.</p> <p>Gap 10: Weak application of intangible assets.</p> <p>Gap 11: Need for stronger returns from R&D investments.</p> <p>Gap 12: Need to anchor post-R&D economic activities in Singapore.</p>	<p>Gap 13: Lack of collaboration and networking between research and industry.</p> <p>Gap 14: Absence of an active marketplace to enable IP transactions.</p>

4.4.1 A key determinant for the future economy is in the ability to commercialise our research outputs. The translation of ideas to the market brings about tangible value to the economy, including through the creation of employment and new products/services. This translation involves the commercialisation of IP. Several gaps have been identified in the area of IP commercialisation-

Expertise

Gap 8: Lack of IP commercialisation expertise.

4.4.2 Both the CFE report and IPTM study found that IP managers or strategists trained to perform IP commercialisation are lacking in Singapore. There is a tendency to regard IP as a legal subject whereas IPM requires a combination technology, legal and business skillsets. There is shortage of IPM experts in Singapore. We need to develop greater IP commercialisation expertise in Singapore.

Regime

Gap 9: Outdated funding models for innovative companies.

- 4.4.3 Companies seek growth capital investments to scale up. The IPFS was launched to allow companies to use IP as collaterals for loans. An example of a company which benefited from this scheme is NSP Tech Pte Ltd, a local R&D intensive company specialising in medical products. It had obtained a loan under the IPFS using its patent portfolio. NSP has plans to expand and enhance its manufacturing capacity with the funds.

NSP Tech Pte Ltd – Monetising IP for future growth



Established in 1995, NSP Tech Pte Ltd (NSP) started as an OEM of plastic products mostly for the electronics and packaging industries. Over time, NSP developed the capability in manufacturing products for use in medical devices for healthcare companies. Today, it specializes in medical products with a keen focus on research and development towards cutting edge technology. It developed the SAFETiCET™ lancet, which is the world's first technology that provides patients with minimum pain when obtaining a blood sample, and had received several IP awards for its research.

With its patent as a collateral, the company has obtained a loan under the IPFS to further its expansion efforts. The funds will be used by NSP to undertake further R&D into other medical products. It aims to be a market leader for health management solutions.

- 4.4.4 A company's value typically does not revolve around one or two types of IP, but around a portfolio of all its intangible assets. IPOS has thus expanded the IPFS to enable trademarks and copyrights, in addition to patents, to be used as collateral in 2016.
- 4.4.5 The IPFS was also intended as a means to encourage Singapore's financial institutions to accept intangible asset as a form of collateral. However, as banks generally operate within a heavily regulated environment and are risk adverse, the traditional funding model of a loan backed by a physical collateral may not necessarily work for today's idea and innovation driven companies. There is scope to introduce private equities, insurers and evaluation companies into this space, to provide innovative companies with more alternative access to financing.

Gap 10: Weak application of intangible assets.

- 4.4.6 As intangible assets become an integral part of the economy, there is an opportunity for businesses to monetise these intangible assets. Current international accounting standard does not require for intangibles to be reflected in a balance sheet unless they have been acquired or properly valued.⁶² This imposes a high bar for IP-rich but physical asset-light companies seeking to raise funds to expand their businesses. Further, many businesses face difficulties in assessing the value of intangible assets.
- 4.4.7 Singapore lags behind economies such as Taiwan, South Korea, China and Hong Kong in terms of growth in intangible assets.⁶³ According to the IPTM study, more than 90 per cent of survey respondents reported that they were spending money on innovation, but close to half booked them as expenditure, rather than investment, in their balance sheets.
- 4.4.8 Without improvement in accounting and valuation practices of intangible assets, financing options for today's innovative companies, for which most of their assets are in intangibles, will be limited. There is thus a need to create more incentives for the commercialisation of intangible assets, as well as putting in place new accounting practices to increase financing options for intangible assets. Some countries have already pushed for more definitive treatment of intangible assets. For example, Japan and Germany had issued directives on intangible asset reporting to include structural, relational and human capital. In Japan, about 200 SMEs and 600 companies have publicly disclosed such intangible assets data.

Gap 11: Need for stronger returns from R&D investments.

- 4.4.9 The Singapore government has committed S\$19 billion for R&D in the next five years under the RIE2020 Plan. Several international benchmarks such as the GII continue to find scope for Singapore to further improve on its innovation outcomes given the tremendous resources allocated by the government to support innovation.
- 4.4.10 The IPTM study calls for better access by the private sector, especially the SMEs, to government IP. Its survey found that some businesses preferred to have exclusive rights when licensing IP, in order to protect their commercial interests. However, some public research institutes leaned towards non-exclusive licensing, in hopes of more widely disseminating new technologies. The study found that greater collaboration between industry and public research institutes, as well as clearer IP commercialisation policies and strategies, may lead to better commercialisation of government IP and innovation outcomes.
- 4.4.11 Further, the study finds a need to better track R&D performance, as in the case of the US, where its Bayh-Dole Act requires grantees to provide post-grant data to authorities on IP licenses. The i-Edison portal in the US, which is a data

⁶² It is a requirement that future economic benefits of intangible assets can be attributable and the cost of this asset can be measured reliably.

⁶³ Brands Finance "Global Intangible Financial Tracker 2016", released May 2016.

system to monitor government funded inventions, enables monitoring of R&D performers⁶⁴.

Gap 12: Need to anchor post-R&D economic activities.

4.4.12 Singapore has many incentives in place to attract R&D activities. In particular, foreign businesses seeking to base themselves in Singapore to perform R&D could apply for grants such as the Research Incentive Scheme for companies (RISC). The RISC provides grants for R&D in technology development. Such schemes are complemented by Singapore's tax regime which encourages the setting up of R&D centers. Beyond attracting R&D activities, the IPTM study finds value for Singapore to consider schemes that enables more post-R&D economic activities to be anchored here, such as commercialisation of IP and production. These activities will create value for Singapore beyond the discovery of new technologies through the creation of better jobs and new product/service lines for Singaporeans. Many economies in the world have put in place tax incentives to promote commercialisation of R&D, thus anchoring more economic activities post-R&D stage.

Marketplace

Gap 13: Lack of collaboration and networking between research and industry.

4.4.13 Applied research is key to successful commercialisation. Through the CFE process, it had been observed that the institutes with closer industry linkages tended to have higher IP commercialisation rates for their inventions. From the onset, a research proposal that is market oriented will ease commercial application of the ensuing invention. For example, Fraunhofer-Gesellschaft, the leading German research organisation, actively pursues industry-led research projects and is recognised as a leading innovator in the world. It is ranked amongst the Top 100 Global Innovators by Thomson Reuters, and had several notable patents with worldwide applications such as the MP3.

4.4.14 The IPTM study also found that SMEs generally own none or only one IP right, thus limiting the extent to which IPs can help these SMEs grow. More support can be rendered to enable SMEs to own or gain access to IP through collaboration with research institutes in Singapore. This will promote exchanges and the development of research partnerships between the industry and R&D institutes.

Gap 14: Absence of an active marketplace to enable IP transactions.

4.4.15 Businesses have reported asymmetrical information in the market and the lack of a platform to transact IP. Unlike the securities market in Singapore, for example, there is an absence of an active marketplace where companies may obtain transparent market information for IP transactions.

4.4.16 The absence of an active marketplace poses a challenge for companies seeking to unlock the value of their IP. Financial institutions will be more willing to accept IP as collaterals in the presence of a secondary market. Existing technology-matchmaking platforms such as Intellectual Property Intermediary

⁶⁴ i-Edison is a system for grantees and contractors to report inventions arising out federally-funded research to the government agency that issued the funding, as require by the Bayh-Dole Act.

(IPI)'s, an agency under SPRING, online Technology Marketplace can be further developed to grow the IP marketplace.

4.5 Conclusion

- 4.5.1 The creation, protection and commercialisation of IP is integral to the innovation cycle. There is opportunity for us to enhance each of these IP phases to achieve better economic outcomes for Singapore. More specifically, there is a need for us to focus on the commercialisation of IP in the next phase of the IP Hub Master Plan. The next section will explore ways in which the gaps discussed above could be plugged.

SECTION 5

FOCUS AREAS AND PLANS MOVING FORWARD

5.1 Overview

- 5.1.1 IP is key to Singapore’s future economy. It is an integral part of the innovation cycle as the government and industries seek to translate ideas into tangible products and services for the benefit of both our economy and society.
- 5.1.2 We have made good progress since the launch of the IP Hub Master Plan in 2013. We have built upon our strong IP regime to forge strong international IP networks for innovative companies seeking to expand overseas. Going forward, we will further strengthen our IP expertise, regime and ecosystem to support an innovative economy.
- 5.1.3 This section proposes a set of recommendations in response to the challenges identified in Section 4. The initiatives set out below are a compilation of the main recommendations taken from our year-long consultation through the IPTM study, CFE/RIE discussions, and survey of international best practices. Some of the initiatives are being implemented while others are in the process of assessment and/or consultation with other agencies.

5.2 Recommendations for Singapore in “IP Creation”

Expertise	Regime	Marketplace
Initiative 1: Develop expertise in technology forecasting and patent analytics.	Initiative 2: Align whole-of-government efforts to support innovative companies.	Initiative 3: Grow and deepen innovation networks.

- 5.2.1 Innovative companies will benefit if they have good IPM practices in place from the start of the innovation cycle. In support of the challenges for IP creation, we will consider the following recommendations-

Expertise

Initiative 1: Develop expertise in technology forecasting and patent analytics.

- 5.2.2 Section 4 highlighted the need to better inform research decisions through IP data. Technology foresighting and patent analytics enable policy-makers and decision-makers to extract valuable insights. It identifies R&D interests, and industry sectors where commercialisation efforts are being concentrated. Such analysis and tools are extensively used in Australia, China, Japan, Korea and the US. For example, Australia piloted a Patent Analytics Hub in 2012, and has since extended its patent analytics services to government agencies, universities and research institutions. Its patent analytic reports have helped Australian innovators make smarter business and research decisions.
- 5.2.3 IPOS is committed to building expertise in technology foresighting for the research community in Singapore. Since the launch of the IP Hub Master Plan

in 2013, IPOS has developed a team of more than 100 patent examiners, most with PhD and expertise that span a wide range of technologies. IPOS has already started to leverage this talent pool to develop capabilities in technology foresighting and patent analytics. It has provided such services to government agencies including the National Research Foundation (NRF). IPOS will further develop this capability with the objective to enable R&D decisions that will lead to greater economic outcomes for Singapore.

Regime

Initiative 2: Align whole-of-government efforts to support innovative companies.

- 5.2.4 Having a strategic view of IP at the onset of an innovation journey requires time and resources. Government support will be necessary to build up the IPM capability of startups and SMEs.
- 5.2.5 While there are ample avenues for businesses to draw on, the IPTM respondents felt that more efforts to align and streamline government schemes are necessary to incentivise and support innovation. This will include streamlining and including IP considerations in all government initiatives that support innovation. As an example, IPOS could partner SPRING to incorporate IP considerations in existing support schemes such as the Innovation and Capability Voucher (ICV) scheme, SEEDs and Angel Investor Tax Deduction (AITD) incentives, and Venture Debt Programme (VDP).

Marketplace

Initiative 3: Grow and deepen innovation networks.

- 5.2.6 The IPTM study highlighted a need for more collaboration among innovators in the ecosystem. Networks help to facilitate information exchange and sharing of best practices. More communities to bring various stakeholders together to find opportunities or collaborate should be forged. To grow and deepen innovation networks, IPOS has started to foster greater cooperation within the innovation community. Among others, IPOS will refresh a Community of Practice on IPM for public agencies with the aim to facilitate better commercialisation of government IP. In addition, IPOS is rendering its support for the creation of “Team Innovation”, which is a setup comprising innovators, IP and technology transfer practitioners aiming to raise professional standards through training and certification.

5.3 Recommendations for Singapore in “IP Protection”

Expertise	Regime	Marketplace
<p>Initiative 4: Strengthen legal and drafting expertise by introducing multiple pathways to patent agent qualifications.</p> <p>Initiative 5: Build and deploy expertise to</p>	<p>Initiative 6: Enable cost effective options for businesses through IP dispute resolution.</p>	<p>Initiative 7: Equip SMEs with IP and business strategy tools.</p>

provide international advice on IP protection.		
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5.3.1 As evident from the annual growth in global patent and trademark filings, companies are becoming more cognizant of the value of IP protection in the innovation cycle. This upward trend will continue with the global focus on innovation as the next engine of growth.

5.3.2 A portfolio of IP provides companies a sustainable competitive edge in key markets. Apart from patents, other types of IP such as trademarks are also crucial to helping innovative companies grow their businesses. For example, Garena, a social media company offering applications software, has successfully integrated trademark protection into its business strategy in a highly competitive market.

Garena – IP for business growth



Headquartered in Singapore, Garena was founded in 2009 by Forrest Li and his friends as they aspired to transform their passion for entrepreneurship into a great company. Today, it is a market leader in digital entertainment in Greater Southeast Asia and has also launched Shopee, a mobile-centric e-commerce marketplace, and AirPay, a digital financial services platform.

Its business is based significantly on the creation, acquisition, licensing, use and protection of intellectual property rights, mainly in the form of trademarks, copyrights, technological know-how and trade secrets, which it produces in-house as well as licenses from third-party business partners.

5.3.3 Under the IP Hub Master Plan, we have laid a strong foundation for IP protection. For instance, we have completed both initiatives under Strategic Outcome 2⁶⁵ aimed at attracting quality IP filings in Singapore. Moving forward, we will build upon this foundation to work on the following initiatives for IP protection.

⁶⁵ The initiatives are (i) to build up patent search and examination (S&E) capabilities in technology areas of strategic importance to Singapore; and (ii) to forge stronger cooperation with other national IP offices, and establish a comprehensive network of Patent Prosecution Highways (PPHs).

Expertise

Initiative 4: Strengthen legal and patent drafting expertise by introducing multiple pathways to patent agent qualifications.

- 5.3.4 It is important for Singapore to develop a sufficient pool of qualified patent agents who are able to support inventors and innovative companies. International benchmarking of patency work volume in foreign jurisdictions suggests a need for Singapore to train more patent agents, especially given the projected increase in global IP filings. We are committed to developing a highly qualified patent agents through a number of ways. First, IPOS and WSG has launched a new IP Professional Conversion Programme (PCP) in March 2017. PCPs are intended to help jobseekers reskill and acquire the necessary competencies to take on new jobs. The IP PCP is a multi-disciplinary programme aimed at equipping mid-career professionals with knowledge in IP law, business and technology. Individuals that undertake the IP PCP will be trained in job roles including patent agents, IP managers and IP technology consultants. The IP PCP is supported by SkillsFuture.
- 5.3.5 Second, IPOS has collaborated with SUSS to roll out Singapore's first ever Master of IP and Innovation Management (MIPIM). A multi-disciplinary graduate programme, MIPIM will integrate IP knowledge and skills from three disciplines, namely, law, technology and business. There will be three specialised tracks⁶⁶, including a patent agent track that will equip students with practice-based training. The MIPIM will enable Singaporeans to upgrade their skills to take higher value jobs.
- 5.3.6 Third, IPOS will create a new pathway for patent examiners with more than seven years of patent S&E experience to qualify as registered patent agents. The infusion of highly qualified and technical professionals will raise the standard of the patent agent profession.
- 5.3.7 These initiatives aim to increase the supply of IP professionals in Singapore, which in turn should make the market for IP service providers more competitive.

Initiative 5: Build and deploy expertise to provide international advice on IP protection.

- 5.3.8 There is a need to equip innovative companies which are exporting their products or service with a good understanding of foreign IP jurisdictions. Our innovative companies are at a disadvantaged position when they are unfamiliar with the IP terrain in overseas markets.
- 5.3.9 We will explore more avenues to assist companies in understanding the foreign IP regimes in our key markets. Other IP offices have already put this in place. A case in point is the UK which has IP attachés in its key export markets including China, ASEAN, Brazil and India. Such overseas offices offer "on-the-ground" support for UK businesses seeking advice on local IP matters, and serve as touch points with host governments and innovation stakeholders. For a start, IPOS has launched its first overseas IP office in China in 2015 to provide

⁶⁶ The Master of IP and Innovation Management offers three specialisations, namely, (i) Patent Agency, (ii) IP Management, or (iii) IP Technology.

IP advisory and assistance to Singapore businesses keen to set up in China and vice versa.

Regime

Initiative 6: Enable cost effective options for businesses through IP dispute resolution.

5.3.10 Efforts are also underway to streamline and increase the accessibility of the IP dispute resolution system in Singapore, particularly for individuals and SMEs. A Committee chaired by Justice George Wei and comprising representatives from the judiciary, academia, IP-rich companies and government agencies was appointed by MinLaw in 2015. The Committee's recommendations, which are aimed at reducing the time and cost of IP dispute resolution, are currently being considered.

Marketplace

Initiative 7: Equip SMEs with IP and business strategy tools.

5.3.11 The IPTM study highlighted some of the strategies adopted by other countries to improve the accessibility to IP advice and strategies for SMEs. The study noted that interactive online tools that are based on the principle of 'mass customisation' enable users to have an individual, tailored experience with a generic tool. For example, UKIPO had hosted interactive tools on its website, named "IP Healthcheck", to help businesses understand how to protect and exploit their IP. Since its launch in 2009, "IP Healthcheck" had recorded more than 22,000 uses.

5.3.12 Complementing broad-based tools, some countries are also providing capability building to their SMEs in the form of more bespoke IP advices and business strategies. In the UK, companies are able to make use of government-subsidised IP audit programmes provided by independent specialists. These audits have proven to be effective, with 82 per cent of companies that were put through the programme either applying for IP protection, as well as licensing or franchising their IP assets. Other than the UK, the Korean Invention Promotion Agency (KIPA) also has similar programmes in place to support SMEs in growing their businesses through their IP. KIPA staff can be assigned to SMEs for a period of up to five months to render patent analytic, licensing, IP dispute and business development services. This service is available at no charge to the SMEs, and approximately 40-45 SMEs apply for such services annually.

5.3.13 It is instructive from the experience of countries like the UK and Korea that there are a wide range of programmes that may uplift companies' knowledge on IP. IPOS will partner various trade and business associations such as the Singapore Business Federation (SBF) to reach out to and support the IP needs of Singapore enterprises. Since the launch of the IP Hub Master Plan, IPOS has implemented several assistance programmes for SMEs such as complimentary IP legal and business clinics. These clinics link IP owners and businesses with experts on franchising and licensing, intangible assets management, IP financing and valuation and IP dispute resolution matters. To further augment our support for SMEs and startups, IPOS will study the

feasibility of an IP pro-bono pilot programme to help young innovators and entrepreneurs in IP prosecution.

5.3.14 To support Singapore enterprises, IPOS will be launching a self-help business portal, comprising business guides and diagnostic toolkits. Innovative companies will also be able to obtain customised one-on-one assistance for IP Audit, IP Strategy and IP Policy, with up to 70 per cent of the cost being funded by the government. This will be done through partnerships with bespoke IP consultancy and evaluation firms overseas. With these initiatives, companies will have more ready access to IP advice pertinent to their business strategies.

5.4 Recommendations for Singapore in “IP Commercialisation”

Expertise	Regime	Marketplace
<p>Initiative 8: Develop expertise in IP commercialisation.</p>	<p>Initiative 9: Pilot new financing models for IP assets.</p> <p>Initiative 10: Promote intangible asset reporting in Singapore.</p> <p>Initiative 11: Develop a national IP protocol and whole-of-government Master Research Collaboration Agreement (MCRA).</p> <p>Initiative 12: Refine tax incentives to anchor economic activities in Singapore.</p>	<p>Initiative 13: Develop platforms for better tracking of IP and innovation performance.</p> <p>Initiative 14: Improve access to IP market information.</p>

5.4.1 IP is not about law, but business. IP creation and protection incur significant investment. Beyond fees, IP has a life span. Patents, for example, may be protected for 20 years. Innovators and entrepreneurs with the requisite knowledge and expertise in translating ideas to the markets are best able to unlock the value of their intangible assets, specifically IP. When used strategically, IP can give companies a sustainable competitive edge in key markets. Moving forward, we will focus our efforts on helping IP owners and businesses to better manage and transact their IP through the following initiatives.

Expertise

Initiative 8: Develop expertise in IP commercialisation.

5.4.2 The CFE has recommended for Singapore to significantly grow the community of IP and commercialisation experts, including valuers and strategists, to support the commercialisation of innovation.

- 5.4.3 IPM is critical in business strategy and decision-making. The CFE report and IPTM study recognise that IPM expertise is lacking in Singapore. As an emerging skill set, IPM expertise involves a combination of technology, legal and business knowledge. Our survey suggests that such IP roles command a pay premium of 30 per cent more. Going forward, we are committed to growing more IPM experts to support Singapore's drive towards becoming an innovative economy in several ways.
- 5.4.4 First, IPOS will develop and centralise IPM expertise for the whole-of-government. The experts will in turn be deployed to public agencies through projects or secondments. IPOS has already seconded its officers to SGInnovate and NRF. These IPM experts will help public agencies to better commercialise government IP. They will also advise on IP policies and practices that help to drive industry growth and innovation outcomes. The IPM experts will also support economic agencies such as SPRING and International Enterprise (IE) Singapore, so that innovative companies under their respective ambits may also benefit from the central pool of IPM experts.
- 5.4.5 Second, we will grow Singapore's skillsets in IP valuation and evaluation. With the exponential increase in investment and market value of intangible assets, we will need more finance professionals who are au fait with IP as the new currency for the future economy. International accounting practices already require companies to recognise and value all identifiable intangible assets as part of a transaction (e.g., in a merger or acquisition).
- 5.4.6 In parallel with efforts to develop valuation expertise, Singapore will seek to establish a set of practices, standards and certification on IP valuation. We will also explore partnerships with international certification bodies for international adoption of these IP valuation practices and certification programme.

Regime

Initiative 9: Pilot new financing models for IP assets.

- 5.4.7 The year-long consultation reaffirms the need to provide innovators and innovative companies with adequate access to financing. While the IPFS has been enhanced, more can be done to support innovative companies which are generally IP-rich but physical asset-light.
- 5.4.8 We will explore alternative financing models for more innovative companies. Banks tend to be more risk averse and prefer the usual mortar and brick business model. We will consider public-private arrangements with private equity firms, such as Makara Capital, a global financial services firm, to provide new ways of financing growth for physical asset-light but tech-rich companies.

Initiative 10: Promote intangible asset reporting in Singapore.

- 5.4.9 Studies have shown that as high as 80 per cent of a company's valuation is in its intangible assets, yet most of this value is not reflected in the accounting books. For example, intangible assets that are not transacted (e.g., inventions developed in-house and brands) will not be reported in the financial statements.
- 5.4.10 Globally, governments and companies alike are actively exploring ways to "monetise" IP and intangible assets. For a start, the IPTM study recommended

the development of guidelines for intangible asset reporting in Singapore, such as encouraging voluntary listing of intangible assets. Countries such as Japan and Germany already have in place such practices, as highlighted in Section 4. We will explore other initiatives to encourage more companies and service providers to take an active interest in identifying, reporting and realising IP value. If intangible assets can be effectively accounted for, companies will be better able to obtain a wider range of financing options and monetise their intangible assets.

Initiative 11: Develop a national IP protocol and whole-of-government Master Research Collaboration Agreement (MRCA).

5.4.11 A key recommendation from the CFE is to develop and implement a standardised IP protocol, which is to be adopted by all public agencies and publicly-funded research performers (e.g., A*STAR Research Institutes, autonomous universities and hospitals). The key objective of the national IP protocol is to drive commercialisation of IP arising from publicly-funded R&D.

5.4.12 IPOS, together with NRF, A*STAR and other agencies, have started discussion to update the national IP protocol and MRCA. The national IP protocol will simplify, standardise and shorten IP negotiations by the industry with public research institutes. The efforts are aimed at speeding up collaborations amongst researchers, industry and government agencies. The public agencies will also work together to refresh and extend the existing MRCA for R&D collaboration projects between major public research performers. The aim is to speed up IP negotiation and drive timely commercialisation of government IP.

Initiative 12: Refine tax incentives to anchor economic activities in Singapore.

5.4.13 The IPTM study recommended for Singapore to consider fiscal incentives, including tax-based schemes that could encourage more commercialisation of IP and value capture in Singapore. A tax-based incentive raised for consideration was an “IP box” regime that is compliant with the OECD Base Erosion and Profit Sharing (BEPS) Action Plan. An IP box or its equivalent will build on existing innovation-related incentives such as R&D tax deductions, to facilitate commercialisation of IP arising from local R&D. Beyond attracting foreign companies to conduct R&D here, it will anchor more post-R&D economic activities in Singapore, thereby creating jobs and new products/services for the economy.

5.4.14 IPOS will partner EDB, MOF and other economic agencies to introduce an IP Development Incentive (IDI) scheme that is intended to encourage the exploitation of IP arising from R&D activities. This scheme will promote R&D investment and innovation, as well as anchor high-tech industries in Singapore.

Marketplace

Initiative 13: Develop platforms for better tracking of IP and innovation performance.

5.4.15 As we explore how to increase the interaction and collaboration between research institutes and industry, we need to have a good understanding of the flow from innovation to IP creation, protection and commercialisation. Many countries, in particular the Nordic countries and the UK, have already

recognised the importance of tracking and measuring this flow. For example, New Zealand publishes an annual Science and Innovation System Performance Report which includes data sets such as funding, academic-business collaborations and business performances. The report also benchmarks New Zealand against other small advanced economies. The IPTM study recommended that Singapore consider adopting a formal model for measurement of research and innovation, to provide a better understanding of the innovation, IP and growth relationships. In doing so, we can build upon the data collection and tracking that is already being done by A*STAR and the Department of Statistics.

5.4.16 IPOS will also work with innovation agencies such as NRF on a platform for the systematic tracking of indicators pertaining to the commercialisation of publicly funded R&D. A useful reference is the US government's iEdison system. We will also consider collaborative studies with the academia and industry or business associations to survey and monitor the state of innovativeness in the private sector.

Initiative 14: Improve access to IP market information.

5.4.17 As with markets for other asset classes, transparency and information are important to build investor confidence. The IPTM study highlighted that Singapore should do more to capture intelligence and IP market information to drive the future role of IP in finance. Some of the activities proposed in the IPTM study include (i) the setting up of an IP 'clearing house' to evaluate finance applications and (ii) tracking IP-related agreements to gather data on lending activity and loan performance.

5.4.18 We will explore new platforms to promote transparency and access to market information. They will encourage IP commercialisation, and support our vision for Singapore to be a hub for IP transactions and management. Currently, IPI helps to source for IP in accordance to enterprises' technology needs. The IPTM study suggested for IPOS to work with IPI to provide an IP listing and transaction platform which will raise awareness amongst domestic firms that IP can be traded. Going forward, IPOS will partner IPI to analyse and bundle complementary IP from Singapore and overseas to further help companies seeking access to IP.

5.4.19 In addition, the presence of secondary markets is important to encourage lenders to consider IP assets as loan collateral. The IPTM study suggested for Singapore to consider establishing greater connectivity with brokerage and disposal services in countries such as the US, China and Europe. These links will create opportunities for Singapore lenders to experiment with alternative recovery methods for any distressed IP assets. It will also attract foreign brokers to use Singapore as a springboard for greater region-wide activity.⁶⁷

⁶⁷ ICAP, for example, is the largest and most experienced US auction house for IP assets (having taken over the auction business of Ocean Tomo LLC) and has expressed active interest in establishing a Singapore base.

5.5 Conclusion

5.5.1 Whilst Singapore's IP landscape had developed well under the IP Hub Master Plan, we recognise the need to adapt to our dynamic environment by enhancing existing initiatives and introducing new ones.

5.5.2 Significant work has been done for Strategic Outcome 2 (a hub for quality IP filings) and ongoing work is being done for Strategic Outcome 3 (a hub for IP dispute resolution), so this update to the IP Hub Master Plan naturally focuses on work to be done for Strategic Outcome 1 (a hub for IP transactions and management). Within this area, we are also guided by the CFE/RIE discussions, where it is clear that IP needs to support innovation in Singapore. Therefore, the recommendations focus on how we can assist enterprises manage and extract value from their IP, tapping upon the international connectivity that we have built up and will continue to enhance.

5.5.3 Our evaluation and recommendations are the result of a year-long consultation involving key stakeholders in Singapore and overseas. The IPTM study had estimated at least S\$1.5 billion of direct value add to Singapore's economy over the next five years if these initiatives are implemented well. This estimate is conservative as it did not take into account indirect value add. Whilst work has already started for some of the recommendations, IPOS and MinLaw will explore the feasibility and implementation of other initiatives, in consultation with our innovation and economic agencies. In totality, these recommendations will help to capture greater economic growth from Singapore's innovation efforts. The desired outcomes of these recommendations are as follows -

Expertise	Regime	Marketplace
<ul style="list-style-type: none">Increase the number of experts in IP, especially IP commercialisation. Overall, to increase IP jobs from 500 to 1,000 over the next 5 years.	<ul style="list-style-type: none">Achieve efficiency ratio rank of 65 in WIPO Global Innovation Index in 5 years.	<ul style="list-style-type: none">Help 1,500 companies understand the value of their IP by 2019Provide customised 1-on-1 IP audit and IP strategy assistance to 150 companies by 2019

5.5.4 IP creation and IP protection remain fundamental to businesses and innovators. However, IP commercialisation is increasing in importance as it enables innovative companies to capture value from intangible assets. This timely update to the IP Hub Master Plan, with its new focuses and initiatives, will help businesses and innovators better commercialise IP, thus generating better economic outcomes in our future economy.

5.5.5 We will also continue to remain alive to our ever-changing environment, review our position, and adapt as necessary.